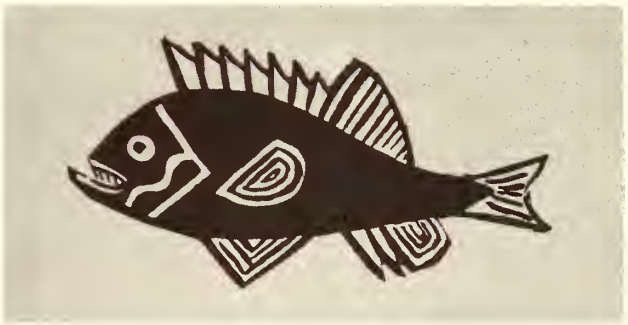
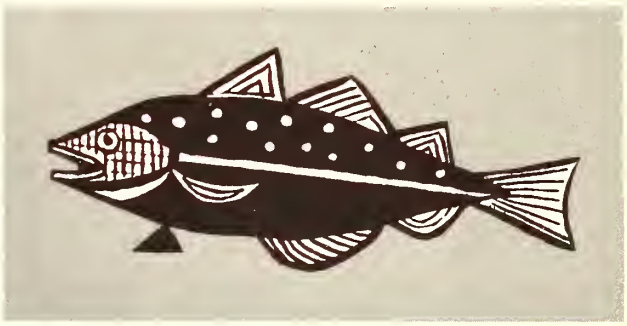


A Market
Research Study
for a Proposed

Alaska Bottomfish Industry



U.S. DEPARTMENT OF COMMERCE
AREA REDEVELOPMENT ADMINISTRATION

A MARKET RESEARCH STUDY

FOR A PROPOSED

ALASKA BOTTOMFISH INDUSTRY

Prepared for ARA by Wolf Management Services

under a technical assistance contract

February 1965

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary
Area Redevelopment Administration
William L. Batt, Jr., Administrator

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FOREWORD

The basic responsibility of the Area Redevelopment Administration of the U.S. Department of Commerce is to help revitalize the economies of American communities suffering from chronic unemployment and underemployment.

One way of assisting a community or region is to determine the nature and magnitude of its economic problems and indicate possible solutions. ARA helps do this through its Technical Assistance program.

This publication is the product of a technical assistance contract with Wolf Management Services, New York, N.Y. It examines the economic feasibility of expanding the Alaska bottomfish catch and processing industry in order to extend periods of employment among fishermen and create additional employment opportunities.

While ARA assumes no responsibility for the conclusions and recommendations in this study, it believes they may be useful both to Alaskan fishing communities and to other areas with similar resources and development problems.

William L. Batt, Jr., Administrator
Area Redevelopment Administration

A MARKET RESEARCH STUDY

FOR A PROJECTED ALASKA BOTTOM FISH INDUSTRY

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CHAPTER I

INTRODUCTION, SUMMARY AND RECOMMENDATIONS

1 A. BACKGROUND AND OBJECTIVES

In 1963, 390,825,000 pounds of fish and shellfish were landed in Alaska, providing the state's fishermen with an income of $46,859,000.1/ Prepared for market, the processed products were worth $109,038,000.2/

Although they are significant because of the large role they play in the economy, the state's most important fisheries--salmon and halibut--are seasonal and provide employment for only minor portions of the year.

Bottomfish represent an unexploited Alaskan resource. This group of flatfishes, rockfishes and roundfishes, living and feeding in offshore waters, near the bottom of the continental shelf and slope, is almost totally ignored by North American commercial fishermen. In 1963, a total of 90,570 pounds of bottomfish (exclusive of halibut, a related flatfish) were landed, netting the state's fishermen $6,340.3/ Prepared for market, their wholesale value was only $7,240.4/

Bottomfish industries have existed on the east and west coasts for many years. With the post-World War II development of frozen fillets and blocks, the growth of U. S. consumer demand has outstripped the output of the U. S. Producers and has provided large-scale, efficient foreign processors with huge new markets.

As the tide of bottomfish imports has risen with the passing years, more attention has been directed toward the exploitation of Alaska's bottomfish resources for two major reasons: to help fill the present demand...and to assist in the state's economic development.

A vigorous bottomfish industry could extend periods of employment among fishermen; instead of the present pattern of a 3-4 month salmon and halibut season and chronic unemployment of fishermen during most of the year, opportunities for year round work could be increased.

1/1963 Alaska Commercial Fisheries Catch and Production Statistical Leaflet #7, Alaska Department of Fish and Game, p. 3.
2/Ibid., p. 11.
3/Ibid., p. 3.
4/Ibid., p. 11.

Processing would create additional employment opportunities in an area where new jobs are difficult to develop and old ones hard to maintain (i.e., the salmon and halibut industries, historically important to Alaska's economy, evidence a long-term decline.)

However desirable, an Alaska bottomfish industry cannot automatically be assumed feasible. The present bottomfisheries of Washington, Oregon and California are far from healthy. In many areas fishermen operate under processor-imposed limits, because of competitive difficulties which hinder disposition of landed catches. Since the southernmost tip of Alaska is more than 1,000 road miles away from the "lower 48" and their potential markets, and the state has the highest U. S. wage rates, it would be foolish simply to attempt a duplication of existing west coast practices and facilities, especially in view of the marketing difficulties the west coast processors are experiencing.

Unless a proposed Alaska bottomfishery uses more efficient vessels and gear than the present west coast industry; unless it employs more modern processing and distribution methods; unless, in short, it avoids the technical shortcomings characteristic of the bottomfish industries on both east and west coasts, it cannot expect to approach economic viability.

Those familiar with the U. S. bottomfish industry know how profound are inertia and resistance to change in many of its segments. Little fishermen and processors are typical; with their supporters, they have made the introduction of new concepts and techniques exceptionally difficult. Thus the lack of an existing bottomfish industry in Alaska could prove to be an advantage; creation of a vital, new fishery complex would not be handicapped by tradition or traditionalists.

1 B. SCOPE OF THE STUDY

According to the terms of the ARA contract with Wolf Management Services, this is "a market research survey for a projected Alaska Bottomfish Industry, to determine the extent to which the products of processed Alaska bottomfish would be able to enter present markets, competitively, and provide estimates of the long-range potential of such products."

Although the availability of the resource is acknowledged by most observers of the Alaskan scene, many have questioned the marketability of Alaska bottomfish in the "lower 48". For this reason, ARA, with Bureau of Commercial Fisheries' concurrence, engaged Wolf Management Services,

then conducting an economic study in Alaska,5/ to investigate the marketing possibilities. ARA felt that if it were determined that Alaska bottomfish can be distributed economically, this preliminary research study would help pinpoint the markets which could be reached and developed, and thereby provide a practical framework for subsequent decisions concerning size and nature of the production facilities which might be eventually established.

That Alaska might encounter difficulties competing in "lower 48" markets can be seen by the following:

- Alaska bottomfish have a tiny local market; for sales volume they must be exported. But, as previously noted, Seattle fishermen are on catch limits and west coast supply generally exceeds demand.

- Added transportation and handling costs in marketing Alaska bottomfish might well exceed any possible lower price paid to local fishermen for the product.

- Fishing and processing costs are higher on the west coast than the east coast, and the latter is much closer to the big-potential midwest market. Moreover, the salt water fish that the midwest knows and consumes is from the Atlantic; the midwest knows relatively little about the different-tasting Pacific varieties.

- Although large-scale fish processors have provided risk capital in many "lower 48" ventures, none have yet invested in an Alaska bottomfishery.

1 C. METHODOLOGY AND INFORMATION OBTAINED

The market survey was conducted in three major steps: (1) fact-finding research, (2) analysis of the information developed, and (3) conclusions formulated as a result of the evaluation of the collected data. The survey was conducted by marketing and financial practices specialists from the New York and Chicago offices of Wolf Management Services.

5/ A Technical Assistance Study of Investment Opportunities in Southeastern Alaska...Area Redevelopment Administration, December 1964.

The study proceeded along these major lines:

(1) Field Surveys. These began on March 28 and ended on June 25, 1964.

(a) Alaska Research. Interviews were held in Juneau and Ketchikan with State Fish and Game Economic Development personnel, with Bureau of Commercial Fisheries (BCF) regional personnel, with fish processors, brokers and cold storage officials.

(b) Production and Processing Centers. Processors, filleters, fishing associations and BCF regional and Market News Service personnel and University fisheries specialists were visited and interviewed in Prince Rupert, British Columbia, Seattle and Bellingham, Washington, Astoria, Oregon, San Pedro and San Francisco, California, Boston, Gloucester and New Bedford, Massachusetts, Cleveland, Ohio, Indianapolis, Indiana and Saint Louis, Missouri.

(c) Potential Market Centers. Fish brokers, wholesalers, distributors and BCF Market News Service and Market Development personnel were interviewed in Chicago, Kansas City, Saint Louis, Detroit, Milwaukee and Indianapolis in the midwest, and in Los Angeles and San Francisco on the Pacific Coast.

(d) Visits to Bureau of Commercial Fisheries personnel in Washington, D.C., New York City, Ann Arbor and Terminal Island.

In all, Wolf Management Services specialists interviewed 126 people during the three months of field surveys: 39 fish brokers, wholesalers and distributors; 28 fish processors, fishermen and fishing association officials; 11 state officials and university professors; 4 ARA officials, 4 transportation company executives and 40 BCF officials.

(2) Analysis of Compiled Statistics and Reports. Much has been accomplished in the fisheries research, and the Wolf Management Services specialists obtained access to many past reports and statistical studies. Of particular aid to the team were daily, monthly and annual Market News Service Fishery Products Reports from leading markets and producing centers, and the just-published D. L. Alverson et al study,6/ which provided invaluable information on the extent and availability of bottomfish in the Alaska area. (As

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6/"A Study of Demersal Fishes and Fisheries of the Northeastern Pacific Ocean", Institute of Fisheries, the University of British Columbia, 1964.

will be noted below, however, pertinent data in several important areas was non-existent.)

During the course of the bottomfish market study, the Wolf Management Services team held bi-weekly staff evaluations of adherence to schedules for field visits, secondary research and statistical evaluation.

Monthly progress reports were submitted to the ARA Technical Projects Division, and the Project Supervisor kept in close, continuing contact with ARA's Northwest Division.

Finally, data were summarized and rechecked for the initial draft, missing information was filled in, and the final draft was composed, and was submitted to ARA on October 13, 1964.

The many individuals and agencies, both private and governmental, who were contacted, were cooperative and eager to be of assistance. Wolf Management Services is especially grateful to the Bureau of Commercial Fisheries, whose officials throughout the country went far out of their way to assist in this study. BCF Market News Service, Regional, Economics, Market Development, Biological Research, Technological Laboratory, Statistics, Fisheries Loan and Transportation specialists all provided invaluable information and material. If we cite one above the others - Gene Cope, Supervisor of the Chicago Market News Service - it is because we worked longer and more intimately with him than with anyone else.

A few important words of caution: in attempting to determine the marketing feasibility of an Alaska bottomfish industry, it must be pointed out that this is an assessment which is basically speculative in nature.

We are dealing with a non-existent industry and non-existent product mixes; we have had to assume that key factors such as high quality, dependable supply and price competitiveness are possible. Of necessity we have had to make other assumptions concerning the sizes and natures of as-yet-undetermined production and operating costs. We have had to assume that the somewhat different-tasting Pacific versions of Atlantic bottomfish will gain customer acceptance without undue difficulties. We have had to assume that perfected automatic filleting machines used on Atlantic fish can be used equally well on their Pacific cousins, and that a still unperfected flatfish filleter will be perfected in the immediate future.

In short, we have had to make a whole series of assumptions, based upon probabilities, past experience in similar situations, and upon

"hunch". Because a bottomfish industry can be of such great significance to Alaska in terms of added year-round employment, we have been careful in formulating and projecting our assumptions. We feel that they are objective, reasonable and realistic.

1 D. FINDINGS AND CONCLUSIONS

Bottomfish represent an undeveloped Alaskan fishery resource whose proper exploitation can help fill present demand and assist the state by extending employment and creating new jobs. Recent exploratory surveys indicate that an abundant bottomfish community inhabits the continental shelf and slope from Southern Oregon to the Arctic; that a reasonable sustained production rate could produce 1,600,000,000 pounds annually.

Commercially important species available in quantity include Dover sole, English sole, Petrale sole, Rex sole, Pacific Ocean perch, other rockfishes, sablefish, Pacific cod and lingcod. Potentially important but not now exploited for human consumption are Pacific pollock, hake and turbot. Pacific Ocean perch is the dominant form, with turbot and Dover sole ranking behind.

Present U. S. and Canadian west coast bottomfishing ranges from Santa Barbara, California to Hecate Strait, off British Columbia and is carried out by small vessels in the immediate vicinity of shore and in regions situated fairly close to markets.

This Pacific bottomfishery is small and technologically outdated, and far from healthy; it lands an average of approximately 135,000,000 pounds--almost half of which is caught off British Columbia. U. S. and Canadian landings are largely influenced by market demand, rather than availability of species; only certain marketable species are retained from total catch.

Markets and Marketing Factors

The key west coast bottomfisheries--Pacific flounder and sole, Ocean perch, and, to a lesser extent, cod compete with more widely marketed, better accepted, similarly named Atlantic varieties whose preferred taste and flesh characteristics make comparative marketing projections hazardous. The exclusive-to-the-Pacific varieties, rockfish, sablefish and lingcod, are relatively unknown and relatively unimportant. These factors set market penetration limits for Alaska bottomfish.

Overall market potential is also affected by the rapid recent penetration of the frozen market by the efficient, modern fisheries of eastern Canada and Europe, and a lack of growth in U. S. per-capita fish consumption.

Imports of frozen fillets and blocks (many of the latter from U. S.-owned subsidiaries) benefit from lower wages, vertical integration, more efficient operation and subsidies. Import tariffs and quotas have been unable to slow the inward flow; many may soon be reduced and/or eliminated.

Foreign costs are rising faster than those in the U. S. A more modern, more rationally organized U. S. bottomfishery may in time become more competitive and regain part of its lost markets.

Unfamiliarity, as well as east coast and import competition, have all acted to limit west coast bottomfish sales in key potential markets.

Successful marketing of the relatively little-known and appreciated Alaska bottomfish resource will require concentration upon the better-known, better-accepted west coast species, in convenience forms. The more speculative species and manufactured forms should be avoided.

Analysis of market factors indicates that the midwest, Pacific coast and southwest, in that order, are primary potential targets for Alaska bottomfish. These are becoming progressively more fractionalized into separately-supplied metropolitan areas, which require individual development...possibly at great expense.

A subsidiary potential sales source is the Defense Subsistence Supply Agency, which purchases substantial quantities of U. S.-produced frozen bottomfish fillets.

Pacific varieties accounted for 7% of frozen bottomfish fillet receipts in Chicago during 1963; substantial quantities of frozen Atlantic bottomfish are shipped to the west coast.

Raw materials represent a minor cost for an Alaska bottomfishery; more important are those of processing, handling, storage, distribution, promotion and packaging. Probable transportation costs are much smaller than many believe.

Product Factors

Sales of fresh ocean bottomfish are declining. For Alaska, the marketing of fresh ocean fish is risk-filled because of perishability,

wide price fluctuations and intense competition from local suppliers. At best, fresh fish can only be a small speculative specialty in an Alaska bottomfishery's production.

Concentration must be on frozen fillets and, to a lesser degree, IQF (Individual Quick Frozen) portions. Mass marketing of frozen blocks seems impractical because the northeast Pacific lacks in species and/or acceptance the vast groundfish resources (primarily cod and haddock) which form the backbone of the highly-developed, low-priced block and slab industry.

The element of seasonality introduced by the differing price structures on the U. S. east and west coast is more significant for fresh than for frozen fish, because cold storage increases flexibility by retarding perishability. Seasonal landing price pattern fluctuations tend to smooth out by the time the frozen processed fish reach the wholesale market. More important in their impact upon selling prices are quality differences and cold storage holding/demand ratios.

An Alaska bottomfishery must be competitive; it cannot hope to penetrate the markets with premium prices (even if a markedly superior product could be developed). The frozen fillet and portion business is low-class, low-end and price-oriented, with little room for error in any phase of operation.

Recent catch, marketing and cold storage holding trends, and current relative sales patterns for similar Atlantic and Pacific varieties indicate that the marketable production of an Alaska bottomfishery would roughly consist of the following product mix:

Dover sole	45-50%
English & Petrale sole	15%
Pacific Ocean perch	20-25%
Other rockfish	6%
Sablefish, Pacific cod and lingcod	10%

Approximately two-thirds of the marketable production would be in frozen fillet form, roughly 30% would be IQF and the remainder would be dressed sablefish.

Pacific Ocean perch, although more limited than flounder and sole in potential sales, could have a bright future to the extent that it proves capable of replacing the rapidly disintegrating Atlantic Ocean perch fishery. For the minor species--other rockfish, sablefish, lingcod and Pacific cod--the outlook is less promising. Sales increases will depend upon intensive market development work. (These projections assume that present taste and smell objections can be overcome through improved handling and processing techniques.)

With sufficient experimentation and development, Pacific pollock and hake might become commercially saleable in limited quantities.

Long range trends indicate an increasingly favorable climate for convenience items, such as IQF, portions and frozen fillets, and continued decline of fresh (unless irradiation is perfected in the near future; if and when it is, it will revolutionize fish marketing).

A viable Alaska bottomfishery would probably have to process the gurry from the filleting process into fish meal. However, the meal's high bulk-low value ratio and its relatively low protein content might bring the f.o.b. plant selling price down to a marginal level.

Other Feasibility Factors

The bottomfish industry, which is experiencing competitive difficulties from imports, is generally skeptical over the feasibility of an Alaska bottomfishery. Many cannot conceive how "bad climate, high wage, far distant Alaska" can become the anti-import standard bearer for U. S. processors.

Much of this reasoning is based upon an imagined transposition of current west coast processing practices to Alaska. The few who can visualize a large, efficient bottomfishery are concerned lest it drive out the present west coast industry. A modern, mechanized Alaska operation would have a major effect on present U. S. west coast landings. Importantly, much of the west coast bottomfishery is a "part-time" business; few important processors concentrate mainly upon the lowly bottomfish.

Professionalism is essential in all phases of production and distribution. This professionalism must run the gamut from management to technicians, from production chief to brokers and distributors. During the early trial-and-error period, survival will depend upon the dispatch with which unpredicted production and marketing problems are solved, with which unexpected opportunities are exploited.

The absence of even a rudimentary bottomfish industry may prove to be an advantage. Without the handicap of traditional methods imposed by small-scale vested interests, the way is open for technological and operational improvements which could make Alaska's industry as efficient as the foreign sources that now dominate the U. S. market.

Because Alaska fishermen would probably be closer to productive grounds and would use larger, more efficient vessels, they could be expected to catch more per unit of effort, and therefore could be paid less per landed pound than their Seattle counterparts.

Higher Alaska labor costs make it important that hand processing be reduced to a minimum. Mechanical roundfish filleters are used on the east coast and are believed to be adaptable to west coast varieties. But the absence of a perfected mechanical filleter for flatfish (the chief product of an Alaska bottomfishery) will adversely affect processing costs.

Markets do exist for Alaska bottomfish; the resource is present and to all appearances available for exploitation. In view of the considerable potential of the resource and the apparent marketability of many species, it is hoped that alert private investors will continue to investigate the possibilities.

CHAPTER II

ASSESSMENT OF THE NORTHEAST PACIFIC BOTTOMFISH RESOURCE

2 A. INTRODUCTION

As a background to the delineation of potential markets for Alaska bottomfish (see Chapter III), this Chapter reviews the bottomfish resource of the Northeast Pacific--the area from the southern border of Oregon to the Chukchi Sea, north of the Bering Strait, off Alaska.

Covered in succession are (1) the extent and availability of Northeast Pacific bottomfish, and (2) the nature and distribution of the present fishing effort. It will be noted that there is no direct correlation between the two; market demand, rather than resource availability, is the key factor determining which fish are landed.

The following description of the bottomfish resource is based on the excellent recently published work by Alverson et al.: "A Study of Demersal Fishes and Fisheries of the Northeastern Pacific Ocean", Institute of Fisheries, the University of British Columbia, 1964.

Although otter trawling (the chief method for catching bottomfish) was introduced on the west coast of Canada in 1903, it was not until 1925 that a sustained fishery developed in the Pacific Northwest. The greatest growth of the trawl fisheries followed the entry of the United States into World War II, when a rapid increase in military installations and personnel along the west coast, together with meat shortages, created an increased demand for food fish.

Between 1940 and 1945 trawlers gradually worked north to the productive grounds off British Columbia, and the fishery was extended seaward to the 100 fathom contour. As a result of increased markets and the advent of filleting and freezing techniques, Pacific Northwest trawl landings increased from 12,000,000 pounds in 1940 to nearly 70,000,000 pounds in 1945.

During recent years otter trawling has been conducted from Santa Barbara, California to northern British Columbia, just south of Alaska. Extension of the fishery south of Santa Barbara has been prohibited by California state law. Canadian trawlers normally do not fish off the west coast of the U. S.; their most important trawl grounds lie between Cape Scott and northern Hecate Strait, off British Columbia. U. S. Puget Sound-based vessels also exploit the

same areas, but somewhat less successfully, for their small size (range from 50 to to 80 feet in length), small capacity and slow running speeds (about 9 knots average) have reduced their ability to obtain maximum benefits from these more productive but distant grounds; they have to operate longer at sea and journey farther from home port than their Canadian competitors.

Pacific bottomfish have in many cases well-known counterparts in the Atlantic, where there is an extensive U. S. and foreign industry. However, there are individual species differences between similarly named fish from the two oceans. Taste and flesh-consistency often vary, too, rendering comparisons difficult and often dangerous.

The Pacific bottomfish resource is further characterized by the absence of at least one key Atlantic species--haddock--as well as the presence of several unique Pacific varieties (i.e., sablefish and lingcod), which unfortunately are much less important.

Figure 1 shows the common and scientific names of Pacific species included in the bottomfish category.1/ Omitted from the list is halibut (Hippoglossus stenolepis), a Pacific flatfish which, as previously noted, is the object of a separate, major fishery.

2 B. EXTENT AND AVAILABILITY OF RAW MATERIAL

(1) Region Surveyed

The following information concerning bottomfish extent and availability is based upon an extensive series of exploratory surveys conducted by the U. S. Fish and Wildlife Service and the International Pacific Halibut Commission in the waters from southern Oregon to the Arctic Ocean.2/

Explorations concentrated upon the continental shelf and slope to 299 fathoms; this is the area considered to have the best commercial potential (although with improvements in gear and vessels, deeper waters can

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1/The term "groundfish" has a distinctly different meaning than bottomfish. Groundfish, as used along the Atlantic Coast and in Bureau of Commercial Fisheries publications, refers to five related Atlantic roundfish: Cod (Gadus morhua), Haddock (Melanogrammus aeglefinus), Cusk (Brosme brosme), Hake (Urophycis chuss or tenuis), and Pollock (Pollachius virens). All groundfish are bottomfish; only five bottomfish are groundfish.

2/For a detailed discussion of the nature of the explorations, methods of selection and analysis of date and distribution of sampling, see Chapter III of the Alverson et al. Study.

Figure 1.

IMPORTANT PACIFIC COAST BOTTOMFISH

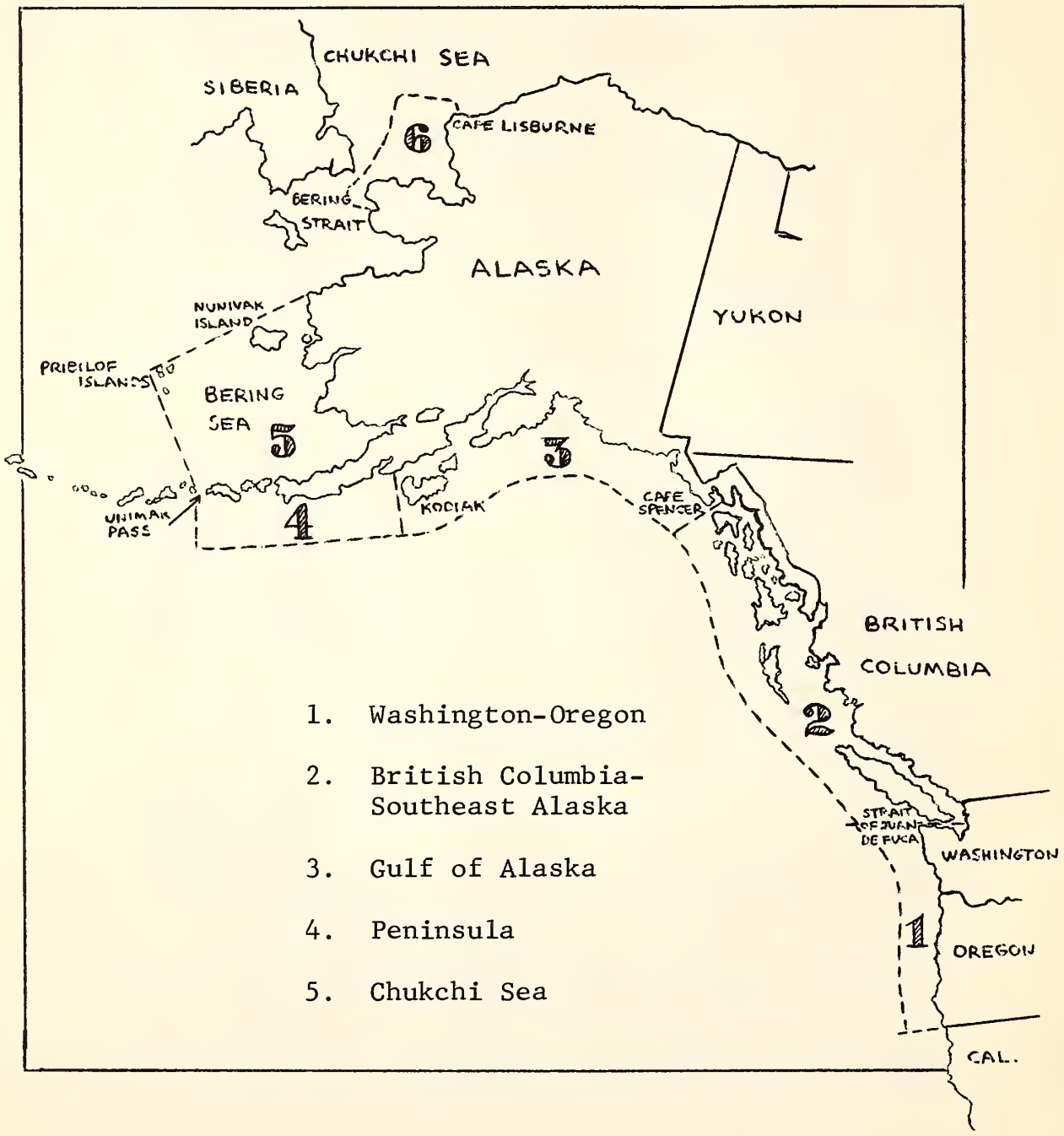
Common Name	Scientific Name
FLATFISHES	
Dover sole	Microstomus pacificus
English sole (Lemon)*	Parophrys vetulus
Petrale sole (Brill)	Eopsetta jordani
Rex sole	Glyptocephalus zachirus
Rock sole	Lepidopsetta bilineata
Turbot (Arrowtooth flounder)	Atheresthes stomias
Starry flounder	Platichthys stellatus
ROCKFISHES	
Pacific Ocean perch (Longjaw rockfish)	Sebastodes alutus
Black rockfish	Sebastodes melanops
Bocaccio (Salmon rockfish)	Sebastodes paucispinis
Chilipepper	Sebastodes goodei
Flag rockfish	Sebastodes rubrivinctus
Orange rockfish	Sebastodes pinniger
Rougheye rockfish	Sebastodes aleutianus
Yellowtail rockfish	Sebastodes flavidus
ROUNDFISHES	
Pacific Hake	Marluccius productus
Lingcod	Ophiodon elongatus
Pacific cod (true cod)	Gadus macrocephalus
Pacific pollock (Whiting)	Theragra chalcogrammus
Sablefish (Black cod)	Anoplopoma fimbria

* Names in parenthesis are secondary common names.

Note: Halibut (Hippoglossus stenolepis) not included in flatfishes.

FIGURE 2.

THE SIX EXPLORATORY REGIONS OF THE NORTHEAST PACIFIC



be fished). The continental shelf and slope are divided into four depth zones:

- the "inner shelf" (less than 50 fathoms);
- the "outer shelf" (50 to 99 fathoms);
- the "upper slope" (100 to 149 fathoms);
- the "lower slope" (150 to 299 fathoms).

For the purpose of analysis, the Northeast Pacific was divided into six exploratory regions: (1) Oregon-Washington, (2) British Columbia-Southeast Alaska, (3) Gulf of Alaska, (4) Peninsula, (5) Bering Sea and (6) Chukchi Sea. (See Figure 2.)

In the Oregon-Washington region and off British Columbia, depths over 50 fathoms were relatively well sampled, but inshore waters received little attention because they are extensively fished commercially. In the Gulf of Alaska and the Alaska Peninsula regions, depths to 300 fathoms were moderately well sampled. The Southeast Bering Sea was extensively sampled (to the 50 fathom contour), and in the Southeast Chukchi Sea, sampling took place from 7-33 fathoms, the maximum depth encountered. Sampling in inside waters in the area was not extensive.

The Northeast Pacific lacks the large offshore fishing banks (i.e., Grand Banks, Georges Bank, etc.) which are so important to the Northwest Atlantic fishery. The continental shelf along Oregon-Washington is barely 20 miles wide; the shelf off the southern end of Vancouver Island extends seaward 35 miles, but narrows along the northwest coast of the island to 7 miles. East of Queen Charlotte Island is the large and extensive shallow-water Hecate Strait Bank. North and west of Cape Spencer (top of Southeast Alaska), the shelf area extends 50 miles seaward as it curves westerly to Kodiak, after which it narrows gradually to the Aleutians. The shelf in the eastern Bering is one of the largest in the world, averaging 400 miles and comprising extensive flat areas less than 50 fathoms. (Parts of the Bering Sea, however, are ice-covered throughout the winter months.) As noted above, the Chukchi Sea is also flat and shallow.

Importantly, the most extensive continental slope areas (those between 100 and 299 fathoms) exist in the British Columbia-Southeast Alaska and Alaska Gulf Regions.

(2) The Bottomfish Community--a Summary

During the exploratory surveys, the average catch of all species per hour of trawl on the outer continental shelf (50-99 fathoms) and the upper slope (100-149 fathoms) in the Oregon-Washington

and British Columbia-Southeast Alaska regions was considerably higher than in the Gulf and Peninsula regions; highest of all was 3,500 pounds/hour on the upper slope off Oregon-Washington.

In all regions where multiple depth zones were sampled, maximum catch rates occurred on the continental slope--a highly significant fact, for most of the present U. S. fishing effort concentrates on the shallower continental shelf area. (75% of Washington trawler effort occurs between 11 and 99 fathoms.)

The community of demersal 3/ fishes studied in the explorations included 55 species and two genera. Five species dominated the fish catch in any one depth zone and region, generally accounting for more than 70% of the aggregate catch (see Figure 3).

On the inner continental shelf (Gulf, Peninsula and Bering Sea regions), soles--rock, starry and yellowfin-ranked first; however, in deep water (200-299 fathoms), sablefish and turbot consistently ranked among the top five forms in the regions south of the Alaska Peninsula.

Pacific Ocean perch was the dominant form in the aggregate species catch throughout the arc of the northeastern Pacific, from southern Oregon to Unimak Pass, at depths from 100-149 fathoms; and ranked among the top five species in the 150-199 fathom depth zone.

Considering all depth zones and regions sampled, turbot ranked among the top five more frequently than any other species. Pacific Ocean perch held second place, and Dover sole third.

The average summer catch rates on the continental shelf are higher than winter rates. The highest interseasonal catch rates occur during the winter months on the continental slope, however. This variation between th shelf and slope is the result of cyclic bathymetric movements of various segments of the resource. During the summer some deep-water forms move onto the shelf; in late fall and winter, these forms move offshore, many congregating along the continental slope.

(3) Estimated Populations

Estimates of the total fish population indicates that the eastern Bering Sea region supports 62% of all demersal species in all regions and depth zones, to 299 fathoms. This reflects the

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3/This term includes elasmobranchs (sharks, skates and ratfishes) as well as bottomfish, which are caught in the same areas.

Figure 3. The Five Most Important Species and their Percentage of Total Fish Catch by Regions and Depth Intervals

1-49 Fathoms	50-99 Fathoms	100-149 Fathoms	150-199 Fathoms	200-299 Fathoms
		OREGON - WASHINGTON		
*	Hake 25% Turbot 13 Dover sole 13 Rex sole 4 Sablefish 4	P. O. perch 47% Dover sole 14 Turbot 9 Sablefish 8 Dogfish 3	P. O. perch 34% Dover sole 21 Sablefish 14 Hake 6 Turbot 5	Sablefish 37% Dover sole 19 P. O. perch 13 Spiny cheek r. 5 Turbot 4
	BRITISH COLUMBIA - SOUTHEAST ALASKA			
*	Turbot 19% P. O. perch 19 Dogfish 11 Shortspine r. 9 Dover sole 9	P. O. perch 47% Turbot 15 Pollock 7 Dover sole 5 Flag rock 4	P. O. perch 55% Turbot 14 Dover sole 5 Ratfish 5 Flag rock 3	*
		GULF OF ALASKA		
Starry sole 14% Rock sole 13 Pacific cod 12 Skate 10 Turbot 9	Turbot 31% P. O. perch 16 Flathead sole 9 Pollock 9 Pacific cod 7	P. O. perch 32% Turbot 28 Pollock 6 Flathead sole 6 Sablefish 5	Turbot 48% P. O. perch 19 Dover sole 10 Flathead sole 6 Halibut 5	Rat tail 32% Turbot 24 Dover sole 18 Sablefish 11 P. O. perch 10
		ALASKA PENINSULA		
Rock sole 29% Halibut 19 Pacific cod 5 Turbot 5 Flathead sole 4	Turbot 19% Flathead sole 11 Pacific cod 9 Rock sole 7 Pollock 7	Turbot 45% P. O. perch 19 Flathead sole 12 Pollock 10 Rex sole 3	Turbot 64% Pollock 12 Sablefish 6 P. O. perch 5 Flathead sole 2	Rat tail 45% Turbot 33 Rex sole 6 Sablefish 5 Spiny cheek r. 5
		BERING SEA		
Yellowfin sole 43% Rock sole 26 Pollock 13 Flathead sole 4 Starry flounder 4				

* Inadequate sampling

Source: A Study of Demersal Fishes and Fisheries of the Northeastern Pacific Ocean, Table 87.

high relative fish density and the extensive shelf in this region. South and east of Unimak Pass the largest population on the shelf and slope (to 299 fathoms) occurred off British Columbia and Southeast Alaska, while the estimated smallest population occurred in the Oregon-Washington region. Although catch rates in the latter were relatively high, the relatively small shelf and slope areas limit the population size.

On the inner continental shelf, flatfishes dominated the populations in all regions for which estimates were made. The total crop of flatfishes on the shelf is estimated at over 9 billion pounds, of which $7\frac{1}{2}$ billion pounds occur on the inner shelf in the eastern Bering Sea. The flatfish population inhabiting the continental shelf and slope between southern Oregon and Unimak Pass is estimated to approach 2 and 1 billion pounds, respectively.

The rockfish populations are most important on the outer continental shelf and upper continental slope to depths of 299 fathoms. In regions south and east of Unimak Pass, rockfish are estimated at about $1\frac{1}{2}$ billion pounds; with the highest crop in the B. C.-Southeast Alaska region (1.0 billion pounds), followed by the Gulf of Alaska and Oregon-Washington regions (0.3 and 0.2 billion pounds, respectively).

As with flatfish, the largest estimated crop of roundfish (exclusive of rockfish) occurred on the inner shelf of the eastern Bering Sea region (1.4 billion pounds). South and east of Unimak Pass, for all depth zones, the roundfish population was estimated at 0.8 billion pounds.

The largest concentrations of elasmobranchs are estimated to occur on the outer continental shelf adjacent to British Columbia and Southeast Alaska.

The above estimates of course consider population only, not potential harvest. Considering 10 pounds per acre per year (about average for the Northwest Atlantic) as a reasonable sustained production rate, the regions investigated between southern Oregon and the Arctic could produce at least 1.6 billion pounds annually-excluding the currently-fished Bering Sea, north and west of the study area. The 1.6 billion figure also refers only to those relatively few species which are currently marketable; full utilization of all species at maximum harvest rates could result in 3.2 billion pounds annually, but this might not be sustained.

Even at the lower level, however, it can be seen that vast amounts of bottomfish are available for exploitation in the northeast Pacific, and off the coast of Alaska.

(4) Flatfishes: Extent and Availability

The following two exploratory fishing catch charts, (Figures 4 and 5), based upon information in the Alverson et al. report, present a clear picture of flatfish resources in the survey area.

Dover sole is the most important commercial flatbish (excluding halibut) harvested off the west coast of the U. S. and Canada. It was found in all regions south of the Bering Sea and at all depths sampled from 1 to 599 fathoms; it was also caught in all inside area drags. Off Washington-Oregon, Dover sole dominated flatfish catches on the outer shelf and slope, with 56% to 91% of the total. North of Washington its percent-of-total flatfish catch declined; however, it remained the second most important flounder off British Columbia-Southeast Alaska to greater than 49 fathom depths. In the Gulf it was second at over-149 fathom depths. Its catch rates were highest from 100-199 fathoms. Dover abundance declined markedly on the shelf north of Cape Spencer, but was still fairly abundant in the Gulf over 149 fathoms.

> Dover sole varied from 11 to 63 centimeters in length; averaged 15 inches.

English sole, a commercially important flounder caught between California and British Columbia, was found in all regions south of the Peninsula, and in all inside areas. Taken between 1 and 299 fathoms, it was an important segment (29.2% to 45.7%) of flounder catches on the inner shelf between southern Oregon and Southeast Alaska; north of Cape Spencer, it declined in importance but was still 3% of the flounder catch on the Gulf inner shelf. Catch per unit effort was greatest by far on the inner shelf in the B. C.-Southeast Alaska region. Average length was 11 inches.

Rex sole: Present in all regions and areas south of the Alaska Peninsula, this commercially important flatfish was found in catches down to 399 fathoms, except in the Oregon-Washington area, where it was absent from the inner shelf. Rex sole is an important segment of flatfish on the slope, where it totalled 2% to 13% of aggregate flounder catch at depths from 100-299 fathoms. Average length was 11 inches.

Petrale sole: This fourth commercially important flatfish was harvested between southern Oregon and Kodiak Island. It was most important in flounder catches made off B. C.-Southeast Alaska, from 1-149 fathoms, where it accounted for 2% to 7% of total flounder catch. It was relatively widespread off this region, where it occurred in 48% to 75% of the drags; the highest catch rate being in the 50-99 fathom interval. Petrale was taken only in trace amounts north and west of B. C.-Southeast Alaska, and was absent from all inside water hauls. Numerically it is not an important constituent of the flatfish community. Average length was $16\frac{1}{2}$ inches.

Figure 4. FIVE IMPORTANT FLATFISH
Maximum/minimum pounds caught per hour, by depth interval breakdown, through 299 fathoms (in exploratory survey)4/

	Oregon-Washington	Brit. Col.-S.E. Alaska	Gulf of Alaska	Alaska Peninsula
DOVER SOLE	494/0	141/3	473/trace	87/trace
ENGLISH SOLE	34/trace	352/0	17/0	trace/0
PETRALE SOLE	9/0	40/trace	trace	0
REX SOLE	49/0	51/trace	63/3	120/1
TURBOT	328/0	314/38	640/78	992/26

Figure 5. FIVE IMPORTANT FLATFISH
Total of maximum/minimum averages, of pounds caught per hour, by depth interval breakdown, through 299 fathoms 5/

	Oregon-Washington	Brit. Col.-S.E. Alaska	Gulf of Alaska	Alaska Peninsula
DOVER SOLE	1,293	391	605	123
ENGLISH SOLE	47	357	21	trace
PETRALE SOLE	13	98	trace	0
REX SOLE	140	104	147	185
TURBOT	635	866	1,853	2,394

4/First figure shows maximum catch in a depth zone; second, minimum catch in a depth zone. Zones were five in number: less than 50 fathoms, 50-99 fathoms, 100-149 fathoms, 150-199 fathoms and 200-299 fathoms.

5/Totals obtained by averaging max/min catch per hour from the five depth zones in each exploratory region.

Turbot was found to be one of the dominant flatfishes from Oregon to the Alaska Peninsula, accounting for 43% to 91% of total flounder catches (by weight) in all over-49-fathom depths in B. C.-Southeast Alaska, Gulf and Peninsula regions. It accounted for fully 90% and 97% of the flatfish catch in the Strait of Juan de Fuca; is one of the larger flounders taken by trawl gear, averaging 15 inches. Turbot, for which little market demand exists as a food fish in the U. S., has been used in substantial quantities for mink food.

Other flatfish of note in the exploratory survey included Halibut, a vital commercial fish, which accounted for 15% to 42% of flounders (by weight) taken on the inner shelf south of the Peninsula, and 10% to 13% of the total outer shelf catch in the Gulf and Peninsula; Yellowfin sole, dominant in the east Bering, but not elsewhere; Flathead sole, important in the Arctic and to a lesser extent in the Gulf and Peninsula; Starry flounder, dominant on the Gulf inner shelf and common in the Bering Sea; Rock sole, important on the inner shelf and in all inside areas south of the Arctic (comprised 22% to 47% of the flounder catch in the Gulf, Bering Sea and Peninsula); and Bellingham sole, important only in the Washington-Oregon and Gulf areas, where it equalled 43% and 14% of the flounder catch, respectively.

(5) Rockfishes: Extent and Availability

The rockfish group did not play an important role in the bottomfish community on the inner shelf, but increased in importance on the outer shelf (50-99 fathoms) and the upper slope (100-149 fathoms). Rockfishes dominated catches south of Cape Spencer, comprising 61% and 36% of total catches in the 100-149 fathom and 150-199 fathom intervals, respectively, off B. C.-Southeast Alaska, and 54% and 46% of total fish catches off Oregon-Washington, for these same intervals.

Pacific Ocean perch is by far the most important species, dominating rockfish catches. In all regions surveyed, Pacific Ocean perch formed the overwhelming proportion of rockfishes at depths between 100 and 199 fathoms. Its importance in the northeastern Pacific bottomfish picture, as well as the rockfish picture, is shown by Figures 6 and 7.

A comparison of Figures 4, 5 and 7 reveals that Pacific Ocean perch is more numerous than Dover, English, Petrale, Rex sole and Turbot, combined. Pacific Ocean perch is most numerous in the B. C.-Southeast Alaska region, in which the crop is estimated at 0.735 billion pounds (out of a total five-region Pacific Ocean perch crop of 1.163 billion pounds). Lengths ranged from 9 to 20 inches, with an average somewhat under 15 inches.

Figure 6. PACIFIC OCEAN PERCH
Percent of Total Rockfish Catch, by Fathom Interval

	1-49	50-99	100-149	150-199	200-299
Oregon-Washington	N.A.	26%	87%	75%	46%
B. C.-Southeast Alaska	N.A.	46%	77%	86%	85%
Gulf of Alaska	89%	98%	88%	91%	trace
Alaska Peninsula	80%	94%	98%	62%	10%

Figure 7. PACIFIC OCEAN PERCH
Exploratory Fishing Survey Results

	ORE-WASH	B.C.-S.E.A.	GULF ALASKA	PENINSULA
Max/min lbs. caught per hr. by depth interval, 50-299 fathoms	1,639/34	4,248/300	445/trace	225/13
Total of max/min averages, lbs. caught per hr. by depth intervals, 50-299 fathoms	2,506	6,100	801	335

Other rockfishes include Short-spined rockfish, important only south of Cape Spencer; Yellowtail rockfish, one of the more important commercial forms harvested by U. S. and Canadian trawl fishermen and common in catches between 50-99 fathoms south of Cape Spencer; Black rockfish, taken in shallower waters south of Cape Spencer; Salmon rockfish (Bocaccio), found between southern Oregon and Kodiak Island; Flag rockfish, found in the same area; and Spiny-cheeked rockfish, which is of minor importance.

(6) Roundfishes: Extent and Availability

The more important roundfishes (excluding rockfish) of the northeastern Pacific number five: Pacific cod, Pacific Hake, Sablefish, Lingcod and Pacific pollock.

Pacific cod, extensively exploited off the Washington and British Columbia coasts, is found all over the area, except in the Chukchi Sea and the inside areas. It is taken between 1 and 299 fathoms. Pacific cod was the dominant roundfish on the inner shelf between the Strait of Juan de Fuca and Unimak Pass--comprised 88% and 87% of roundfish catches respectively in the Gulf and Peninsula, from 1-50 fathoms. Cod decreased in importance further south, declining to less than 1% of the roundfish taken on the shelf off Oregon-Washington. Catch per unit of effort for the fish was highest on the inner shelf of the Gulf region, and was also relatively high in waters overlaying the shelf in the Bering Sea, Peninsula and B. C.-Southeast Alaska regions (as well as the inside waters of Puget Sound). Length of Pacific cod averaged 18 inches in the Gulf and 16 inches in the Peninsula region.

Pacific Hake is found in all regions south of the Peninsula and at all depths through 399 fathoms. Its major contribution to the roundfish community occurred in Oregon-Washington between 50-199 fathoms, where it was 82% of the roundfish catch. It is also frequently found in inside waters of Puget Sound and between Vancouver Island and the British Columbia mainland. North of Juan de Fuca Strait, Pacific hake becomes minor in importance, and only traces are found in the Peninsula. Average size is $22\frac{1}{2}$ inches. It has been speculated that Pacific hake represents one of the large latent resources adjacent to the U. S. Pacific coast.

Sablefish (Black cod), important in U. S. and Canadian commercial trawl and line fisheries from California to Alaska, was taken in all regions south of the Peninsula, and in all depth zones sampled. Commercially exploited along the continental edge in the east Bering Sea, its importance increased with depth in all regions sampled and

south of Cape Spencer. It was the principal roundfish (exclusive of rockfish) at over 200 fathoms. In Oregon-Washington, sablefish accounted for 68% to 93% of roundfish catches over 99 fathoms. Length averaged 21 inches.

Lingcod is not a cod, but rather a greenling of sufficient size and abundance to be harvested by commercial trawlers. Relatively important in the shelf off Oregon, Washington and British Columbia (where it represented up to 3% of total roundfish catch), its frequency decreased markedly north and west of Cape Spencer. Lingcod maximum abundance occurred on the continental shelf, with the majority of the harvest taken between 30 and 70 fathoms. Largest of the roundfishes, it averaged 28 inches.

Pacific pollock is numerically the most important roundfish north of Juan de Fuca Strait; was abundant from there to Unimak Pass between 50 and 199 fathoms, and dominant on the inner shelf of the Bering Sea. From 50 to 199 fathoms, it comprised 36% to 54% of roundfish in the B. C.-Southeast Alaska region, 45% to 56% in the Gulf region and 39% to 66% in the Peninsula region; it also accounted for 82% of roundfish in the Bering Sea. It was unimportant only in the Oregon-Washington region. Length averaged 13 inches off the Peninsula. Unlike its Atlantic relative, Pacific pollock is not yet exploited commercially.

(7) Elasmobranchs

This group (including sharks, skates and ratfishes) comprised important segments of demersal communities in shelf waters south and east of Kodiak; on the slope, however, they were unimportant--comprising less than 5% of the total fish catch.

The Dogfish shark, an important elasmobranch, was once subject of a major commercial fishery along the U. S. and Canadian west coast. It is found in all regions south of the Peninsula, from 1-399 fathoms, and is particularly abundant on the inner shelf off Washington and British Columbia, where it has plagued trawlers to an extent that control or eradication studies have been made. Some have estimated that dogfish population weights exceeded all other bottomfish populations off British Columbia, particularly in the spring and summer.

Other elasmobranchs are ratfish, important in waters between southern Oregon and Cape Spencer, where they comprised up to 92% of the elasmobranch catch between 50 and 149 fathoms; and skates, which dominated the elasmobranch deep-water catches in Oregon-Washington and comprised the overwhelming proportion of elasmobranchs in the Gulf and Peninsula, at all depth zones sampled.

2 C. NATURE AND DISTRIBUTION OF PRESENT FISHING EFFORT

(1) Present Areas of Exploitation

At present, bottomfishing in the northeastern Pacific is concentrated at its lower and upper portions; the center, off Southeast Alaska, is virtually ignored. The southern portion is exploited in a modest way by U. S. and Canadian fishermen; the northern portion is more intensively fished by the Japanese and the Russians.

The U. S. exploited area ranges from Santa Barbara, California to Hecate Strait off British Columbia.6/ Most intense trawl fisheries off California occur between San Francisco and Crescent City, where commercial trawling is conducted at depths ranging from 15 to 350 fathoms. Off the Oregon coast the most intensive trawling is conducted in the waters south of the Columbia River to Tillamook Head. Seattle and Bellingham, Washington trawlers frequent grounds farthest from home ports; they spend much of their time off the west coast of Vancouver Island and in Hecate Strait.

> From 1955 to 1957, from 51% to 68% of food fish taken by Washington vessels was harvested off British Columbia; and close to 50% of the total offshore effort normally occurred north of the state.

Approximately one-quarter of Washington trawler fishing occurs between 11 and 50 fathoms, and one-half occurs between 50 and 100 fathoms. It can thus be seen that the effort is primarily an inshore one. Average summer catch rates are higher than in winter.

As previously noted, Canadian bottomfishermen exploit the waters off British Columbia.

Japanese and Soviet demersal fishing takes place mainly in the eastern Bering Sea; their combined catches are huge and have increased rapidly--rising from 103,000,000 pounds in 1958 to over 1.6 billion pounds in 1961.

Japanese Bering Sea trawling has been conducted between April and October; its catches are mainly processed into fish meal, although some quantities of flatfish are frozen and returned to Japan as food fish. Flatfish dominate Japanese catches, with Yellowfin sole the most common species, and important quantities of Flathead sole, Rock sole, Lemon sole, Turbot and Starry flounder.

6/Otter trawling is forbidden off the California coast, south of Santa Barbara.

1961 Japanese Bering Sea fish landings of 621,000 metric tons were reported as follows:

Bottomfish	Flatfishes	453,963
	Sablefish	26,231
	Pollock	24,404
	Halibut	11,005
	Rockfishes	10,543
	Pacific cod	6,764
Others	Herring	72,260
	Shrimp	10,225
	Others	5,719

Since the Japanese meal fishery in the Bering Sea generally utilizes all species caught, production figures may be considered representative of the relative availability of various species to trawl gear.

The Soviets began full-scale operations in the shelf waters off Alaska in 1959, concentrating on Pacific Ocean perch. Nets rigged for ocean perch fisheries differ from those used to harvest flatfish in the shallower waters overlying the continental shelf. Soviet eastern Bering Sea production appears to be dominated by flatfish (principally Yellowfin sole) and rockfish (mostly Pacific Ocean perch). Their 1961 Bering Sea catch was estimated as 381,000,000 pounds of the former and 107,000,000 pounds of ocean perch. No statistics are available on quantities of Pacific cod, pollock and other roundfish harvested. However, the species involved are believed to be similar to those listed above for the Japanese trawl fishery. The Russians use their catch primarily as food fish.

In 1963 the Bureau of Commercial Fisheries reported that about 200 Japanese and 156 Russian ships were operating off Alaska in the Bering Sea and in the Gulf of Alaska. They consisted of large factory vessels, refrigerator ships, tankers and trawlers.7/ U.S. and Canadian vessels participating in major trawl fisheries in this area would require motherships or shore facilities which are not now available.

(2) Present U.S. and Canadian Fishing Effort

Alverson et al. quote the following from a recent publication by two Soviet scientists:

7/ The Daily Alaska Empire, Juneau, Alaska, June 11, 1964

"The scale of the fishery (off the Pacific coast of the U.S. and Canada) is much less than what the raw material base could warrant; it is limited by economic conditions. The fishery is carried out by rather small vessels in the immediate vicinity of shore and in regions situated not too far from markets, as a result of which the stocks of rockfishes living in...the Gulf of Alaska and eastern Bering Sea are practically untouched by fishermen of the United States and Canada."8/

The statement has a foundation in fact. And it holds true not only for rockfishes in the Gulf and the Bering Sea, but also for bottomfish in general throughout the northeastern Pacific. U.S. and Canadian fishermen do stay close to shore; the outside water potential for bottomfish has, as yet, been neglected by them. And proper vessels and facilities are not available to exploit the resource properly.

At the beginning of this sub-section devoted to present U.S. and Canadian fishing effort, we point out, once again, that landings are largely influenced by market demand rather than availability of species. Only certain species are retained from the total demersal catch brought aboard, and fishing effort is expended at specific times and localities where desirable species are known to occur. For this reason, the following landing statistics of bottomfish in the coastal waters in which the fishery now operates cannot be used to assess the relative abundance of species exploited; in fact, some of the most abundant are least exploited, and vice-versa.

Historically, flatfishes have been the most important group both from a value and poundage point of view, followed by rockfishes and cod (see Figure 8).

Prior to World War II, U.S. west coast trawlers harvested Petrale and English sole. With the War, they diversified to include a wide variety of others. The Pacific Ocean perch fishery developed in 1946. The Pacific cod line fishery peaked during the First World War, but was discontinued during the early 1950's, due to economic conditions. With the development of fish sticks, however, catches of this species have increased again.

The Pacific coast bottomfishery is relatively small. Total landings of trawl-caught bottomfish have exceeded 124,000,000 pounds annually since 1957, but this total is less than 1/10 the size of the current Japanese-Soviet effort to the north, and is also of minor importance compared to U.S. commercial fishery landings of certain Atlantic Ocean bottomfish. In 1963 U.S. haddock

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8/Moiseev and Paraketsov, Information on the Ecology of Rockfishes of the Northern Part of the Pacific Ocean, 1961.

Figure 8. Total U.S. and Canadian Pacific Coast Bottomfish Landings, in Pounds, 1950-1960 (exclusive of halibut, but including fish used for animal food)

Year	Flatfish	Rockfish	Cods	Other	Total
1950	59,383,000	27,096,000	9,426,000	15,589,000	111,494,000
1951	55,854,000	27,961,000	14,259,000	18,769,000	116,843,000
1952	63,097,000	31,856,000	15,026,000	14,031,000	124,010,000
1953	43,831,000	24,713,000	11,830,000	14,052,000	94,426,000
1954	53,014,000	32,662,000	21,889,000	13,189,000	120,754,000
1955	58,111,000	26,030,000	16,393,000	15,377,000	115,911,000
1956	66,957,000	30,367,000	13,651,000	17,868,000	128,843,000
1957	64,016,000	32,292,000	18,424,000	16,785,000	131,517,000
1958	63,255,000	34,313,000	20,431,000	13,757,000	131,756,000
1959	66,409,000	31,345,000	22,490,000	17,091,000	137,335,000
1960	60,100,000	35,295,000	10,604,000	18,769,000	124,768,000

Source: Article, "Pacific Coast Groundfish", Western Fisheries Magazine, Vol. 61, No. 3, 1961, by Dayton L. Alverson.

landings were 123,900,000 pounds (almost as much as all west coast U.S. and Canadian bottomfish combined); while Atlantic Ocean perch landings were 108,300,000 pounds, and Atlantic cod 39,600,000 pounds.9/

Figure 9 provides a five year average of key bottomfish species caught in waters contiguous to Pacific coast states and the Province of British Columbia. From 1956 through 1960 total demersal landings averaged almost 135,000,000 pounds, with flatfishes averaging 57,000,000 pounds, rockfishes 34,000,000 pounds, and other roundfishes (mainly cod) averaging 31,000,000 pounds.

> The demersal poundage caught off British Columbia averaged 59,400,000--almost half of the total. This was caught by both Canadian and U.S. fishermen. 37,000,000 pounds were caught off California (mostly flatfishes and rockfishes), 25,000,000 off Oregon, and 13,000,000 off Washington (whose fishermen concentrate their efforts off British Columbia, and to a lesser extent, Oregon).
>
> The largest flatfish catches were of Dover sole (15,900,000 pounds), English sole (13,000,000) and Petrale (almost 9,000,000)10/

Pacific Ocean perch averaged almost 9,000,000 pounds (over half caught off British Columbia); while other rockfishes averaged 25,000,000 pounds (most caught off California). Pacific cod averaged 18,700,000 pounds and Lingcod averaged 7,300,000 (in both cases, almost all were caught off British Columbia).

Among the lesser catches, most noteworthy were Turbot, 5,700,000 pounds; Rock sole, 4,400,000 (all off B. C.); Sablefish, 3,900,000; and Rex sole, 3,500,000. Catches of Pacific hake and pollock were negligible.

9/Fisheries of the United States 1963 (A Preliminary Review), C.F.S. No. 3500, Bureau of Commercial Fisheries, 1964.

10/In the mid-1950's the states of Washington and Oregon and the Province of British Columbia, through the Pacific Marine Fisheries Commission, invoked a winter Petrale sole closure (December 20-April 15) to protect spawning stocks, which are especially vulnerable to fishing during that period. In a letter dated June 4, 1964, the State of Alaska Department of Fish and Game informed Wolf Management Services that "Alaska would very probably do the same thing were a stock in need of such protection to insure a maximum sustained yield."

Figure 9.

Reported Otter Trawl Landings of Certain Demersal Fishes Caught in Waters Contiguous to Pacific Coast States and the Province of British Columbia, Average 1956-1960 (in millions of pounds)

SPECIES	CALIF.	OREGON	WASH.	BRIT. COL.	TOTAL
FLATFISHES					
Dover sole	7.27	5.32	1.56	1.78	15.94
English sole	4.13	2.16	2.46	4.47	13.22
Petrale sole	2.64	2.08	.47	3.59	8.78
Rex sole	1.42	1.87	.12	.05	3.46
Rock sole	-	-	-	4.37	4.37
Starry flounder	.53	.23	.42	1.03	2.21
Turbot	.51	2.71	.97	3.49	5.68
Other flatfishes	1.72	.54	.23	1.30	3.79
ROCKFISHES					
Pacific Ocean Perch	.64	2.54	.87	4.67	8.72
Other rockfishes	12.69	5.92	1.70	4.64	24.95
ROUNDFISHES					
Pacif. Hake	.51	-	-	.02	.53
Lingcod	1.05	.44	.59	5.23	7.31
Pacif. Cod	-	.23	2.22	16.25	18.70
Pacif. Pollock	-	-	-	.63	.63
Sablefish	2.33	.24	.93	.43	3.93
TOTAL DEMERSAL	36.81	25.06	12.82	59.40	134.09

Source: A Study of Demersal Fishes and Fisheries of the Northeastern Pacific Ocean, 1964, D. L. Alverson et al., Tables 4-7 (based on Pacific Marine Fisheries Commission, 1961, Trawl Statistical Areas)

Figure 10 presents a different and slightly more recent (1961) breakdown; it shows landings of Pacific Ocean bottomfish by states. Of slightly less than 100,000,000 pounds landed in that year, 42% was landed in Washington, 26% in Oregon, 30% in California, and somewhat over 1% (1,360,000 pounds) in Alaska. Because Figure 10 shows landings by state, rather than fish caught in waters contiguous to their coasts (Figure 9), the rank of states is quite different; i.e., Washington rises from last to first place, documenting the large portion of its fishing effort that takes place off other coasts.

Insofar as the 1961 landings were concerned, California, Washington and Oregon fairly evenly divided the number one catch, "sole", which brought the fishermen $2,852,000. Ocean perch (worth $594,000) was primarily from Washington, while other rockfishes (worth $1,137,000) were landed mainly in California. Of the other roundfishes category, Sablefish ($693,000) was most important and it was the only species which was landed to any important extent in Alaska (1,340,000 pounds--20% of the four-state catch). U.S.-caught Lingcod (worth $428,000) and Pacific cod (worth $150,000) were landed primarily in Washington.

A comparison of Figures 9 and 10 with Figure 3, which lists the five most important bottomfish species and their percentages to total fish catch by region and depth interval in the northeastern Pacific, shows strikingly the often wide disparity between resource abundance and catch. The overwhelming Pacific pollock, hake and turbot resources are almost completely neglected. So, in a relative sense, is Pacific Ocean perch. Compared to Dover, English, Petrale and Rex sole, Lingcod and Sablefish, the above-mentioned species are little fished. The same is true of Pacific cod, which is landed in quantity only by the Canadians.

(3) Recent Washington Trawl Landing Trends

Recent Washington trawl landing trends are important because that state's fishermen land more bottomfish than any other on the west coast (see Figure 10), and because the quantity of landings reflects species marketability.

During the past decade, Washington flatfish trawl landings have slowly declined from 12,314,000 pounds in 1954 to 11,239,000 in 1963, after having peaked at 14,186,000 pounds in 1956.11/ In 1963, English sole as usual was first with 4,000,000 pounds (a gain of 500,000 over 1962); Petrale sole was second with 3,000,000 pounds (about the same as 1962); and Dover sole was third with 2,800,000 pounds (a loss of 300,000 pounds). The others were unimportant.12/

11/Pacific Fisherman International Yearbook for 1963.

12/These and the remaining statistics in this sub-section are derived from two sources: (a) 1963 Seattle Landings, Receipts and Value of Fishery Products Annual, Market News Service, Bureau of Commercial Fisheries, and (b) Pacific Fisherman International Yearbook for 1963.

Figure 10.

PACIFIC OCEAN BOTTOMFISH, LANDINGS BY STATES, 1961

SPECIES	Millions of Pounds CAL.	OREGON	WASH.	ALASKA	TOTAL	TOTAL DOLLARS
FLATFISHES						
"Sole"	16.18	12.86	15.29	--	44.33	$2,852,000
ROCKFISHES						
Pacif. Ocean Perch	--	4.57	7.87	--	12.44	594,000
Other Rockfishes	10.83	6.87	7.16	.02	24.88	1,137,000
ROUNDFISHES						
Pacif. Hake	--	.06	.16	--	.22	2,000
Lingcod	1.44	.74	5.82	--	8.00	428,000
Pacif. Cod	--	.10	2.96	--	3.07	150,000
Pacif. Pollock	--	--	--	--	--	--
Sablefish	1.62	.57	3.18	1.34	6.70	693,000
TOTAL OF ABOVE	30.07	25.77	42.44	1.36	99.64	$5,856,000

Source: Fishery Statistics of the United States 1961 (Annual), Statistical Digest No. 54, Bureau of Commercial Fisheries, 1963

The story of Pacific Ocean perch is one of recent uninterrupted growth. Washington otter trawl landings have spiraled from 7,871,000 pounds in 1961, to 11,450,000 pounds in 1962, to 15,278,000 pounds in 1963--jumps of 46% and 33% respectively. During 1963, other rockfish landings were 8,000,000 pounds, a drop of 2,000,000 from 1962.

Pacific cod started off the decade with 15,392,000 pounds landed in 1954. This figure gradually drifted down to the 12,000,000 mark at the end of the '50's. Then, beginning in 1960, cod landings plummeted, barely topping 3,000,000 pounds in 1962. An important feature of 1963's landings was the comeback of Pacific cod, which more than doubled to the 6,315,000 pound mark.

Lingcod landings have decreased markedly during the last two years. Washington's 1954 figure of 1,518,000 pounds rose to 4,745,000 pounds in 1960 and 1961. In 1962, however, landings dropped to 3,464,000 pounds, and last year dropped again to 2,464,000.

In 1963, Sablefish for the first time in many years did not function as a separate fishery, because of the length of the fishing season in Area 2.13/

As a result, Washington landings dropped from 2,379,000 pounds in 1962 to 481,000 pounds in 1963. With the two exceptions of the large 1962 landings and the even larger 3,269,000 pounds of 1956, Sablefish has fluctuated during the past decade from somewhat over 300,000 pounds to almost 1,000,000 pounds--a quite unstable fishery.

Overall, Washington trawl landings have been marked by a fairly steady, slow rise. In 1954, landings were 44,012,000 pounds...in 1963 they had risen 10% to 48,396,000 pounds.

Landing trends cannot be considered indicative of consumption trends. Not all west coast landings are marketed in the areas where the vessels dock. British Columbia frozen fillets are received at Seattle (e.g.

13/The Washington Sablefish long line fleet usually operates out of Seattle under the "permit" system of the International Pacific Halibut Commission, which allows retention of Halibut (one pound to seven pounds of other fish) while fishing for food fish other than Halibut between the end of the Halibut fishing season and a Commission-selected date (usually mid-November). Very early in the 1963 Area 2 Halibut fishing season, regular Halibut fishing vessels began operating on the Sablefish grounds because of the attractive Sablefish prices, which at times were in excess of those paid for Halibut. Practically all Sablefish caught off British Columbia and Alaska are landed by set lines; however, in Washington, Oregon and California the trend is to otter trawlers, as trawlers have begun fishing the deeper waters where the larger Sablefish occur.

230,000 pounds of sole fillets in 1963 and 381,000 pounds of frozen sole fillets in 1962). And, as will be noted in the next Chapter, quantities of fresh Washington-landed fillets go south to the Los Angeles area, and frozen fillets are shipped to the midwest. The 10% rise of Washington trawl landings during the past 10 years, therefore, should not be considered as the simple result of a rise in local consumption. In many other sections of the U.S. landings are decreasing despite an overall increase in consumption. The gap is being filled largely by imports and products of Pacific fisheries. The rise, small as it is, does reveal that even the small and archaic west coast bottom-fishery continues to find customers for its catch. And importantly, the often sharply pronounced trends within the overall product mix reflect shifting demand patterns and an ability to satisfy them competitively.

CHAPTER III

DELINEATION OF POTENTIAL MARKETS

3 A. PRELIMINARY COMMENTS AND MARKET IDENTIFICATIONS

Unlike widely exploited and eminently marketable salmon, halibut and King crab of the northeastern Pacific, its bottomfish are not unique. They must therefore compete, often at a disadvantage, against bottomfish landed by Atlantic coast fishermen, and more importantly, against foreign imports of Atlantic species.

Major Atlantic Ocean bottomfish--flounder and sole, cod and ocean perch--are direct competition for Pacific Ocean varieties; the exclusive Pacific species, such as sablefish and lingcod, are relatively unimportant - and are little known outside of the west.

These factors tend to limit the potential market for northeastern Pacific bottomfish. It can in no way be assumed that the nationwide marketing pattern of Pacific salmon, halibut and King crab can be duplicated by their more ordinary relatives.

The potential of Pacific bottomfish is further affected by the sluggish U.S. market for fishery products. In spite of continuing promotional efforts by fishermen's associations and the Bureau of Commercial Fisheries, per-capita consumption of commercially caught fish and shellfish has not even held its own during recent years (see Figure 11)--indicating that the major growth of a northeastern Pacific bottomfishery will probably be achieved at the expense of existing suppliers of similar species, rather than as a consequence of the opening up of entirely new markets.

Figure 11. PER-CAPITA CONSUMPTION OF COMMERCIALLY-CAUGHT FISH AND SHELLFISH, 1960-1963 (Edible weight, in pounds)

Item	1960	1961	1962	1963
FRESH AND FROZEN	5.7	6.0	5.8	5.8
CANNED	4.1	4.3	4.4	4.3
CURED	.5	.5	.5	.5
TOTAL	10.3	10.8	10.7	10.6

Sources: Fisheries of the U. S. 1962 (C.F.S. 3200) and Fisheries of the U. S. 1963 (C.F.S. 3500), BCF

Although population increases have resulted in small annual rises in the total sales of fish and shellfish, per-capita consumption has actually decreased slightly during the past two years, primarily because of increasing price competition from poultry and other meats. At an absolute level, per-capita fish consumption is low--less than one-sixteenth of per-capita meat consumption.

The fairly constant per-capita consumption figure for fish masks a continually rising amount of imports and a corresponding decrease of U. S. landings. Frozen imports of bottomfish fillets, blocks and slabs rose from 195,099,000 pounds in 1961 to 221,420,000, to an all-time high of 231,728,000 in 1963 1/--a 19% two-year increase.

(1) Potentially Important Commercial Markets

The northeast states are both the home of the U. S. Atlantic bottomfish fleet and the main ports of entry into the U. S. for Canadian and other foreign bottomfish imports. The northeast is, therefore, not the logical major market for competing Alaska species which must first be delivered to the "lower 48" and transported across the continent. The same is true, in essence, for the southeast.

Analysis of market factors including population size, consumption habits, relative distance and transportation facility differences between Alaska and the potential market, on one hand, and present suppliers and the market, on the other, indicate the following to be the primary target areas for Alaska bottomfish:

(a) The Midwest. This key-potential area is not a single or unified market. Chicago is the largest single market by far in the area, but as fish distribution patterns continue to fragment, the Chicago wholesale market is more and more by-passed--making other important midwestern cities increasingly important in their own right. These include: Cleveland, Detroit, Saint Louis, Kansas City (Mo.), Indianapolis and Milwaukee.

(b) The West Coast. Los Angeles is the most important market, followed by San Diego and San Francisco.

1/Fisheries of the U. S. 1962 and 1963 (C.F.S. 3200 and 3500). These figures include groundfish (cod, haddock, hake, cusk and pollock) and ocean perch, but not flounder and sole, which averaged another 18,500,000 pounds, annually.

(c) The Southwest. Smallest potential of the three areas, because of relatively small population. Las Vegas, Phoenix and Salt Lake City are important.

A capsule discussion of the individual markets follows; see later sections of this report for further details.

(a) The Midwest (approximately 30% of U. S. population)

Chicago: Potential #1 market for Alaska bottomfish with a 1962 metropolitan area population of 6,401,000.2/ General distributor consensus is that the area should be good for Alaskan products, if they are competitive in price and quality, and supply is dependable. Market is a large consumer of frozen fillets, fish sticks, portions and IQF (Individual Quick Frozen); flatfish and ocean perch are big potential items. Presently, Chicago is supplied by east and west coasts as well as imports.

Saint Louis: An important market center, serving many more than the 2,127,000 population of its metropolitan area. Alert, home base of large processors who could be interested in Alaska bottomfish, if competitive. They buy from many producing areas; are interested in convenience forms.

Kansas City: 1,104,000 metropolitan area population. Fillets are important; IQF portions are increasing. Fresh shipments of Pacific sole are being supplied.

Indianapolis: Distributors in this metropolitan area of 723,000 are interested in good quality frozen fish, priced right.

Milwaukee: Here there is big competition for potential Alaska bottomfish from locally landed fresh water fish and from imports; limited amounts of Pacific sole and ocean perch sell in the area. Metropolitan population is 1,236,000.

Cleveland: Metropolitan area population 1,857,000. Plentifully supplied by east coast and imports. We noted little knowledge of or interest in Pacific bottomfish, except by large processors in the area, who are extremely price and quality conscious.

Detroit: 3,887,000 in metropolitan area. Situation similar to Cleveland's--supplied by east coast and imports. A large fresh fish market. Name brands and suppliers firmly established.

2/Metropolitan County Area estimates are based on the 1962 Sales Management "Survey of Buying Power".

(b) The West Coast

Los Angeles: Second largest metropolitan area population in nation - 7,138,000. Fresh fish relatively unimportant; most fish consumed in area come frozen from east (imports and some east coast production). Substantial market exists for frozen fillets and portion-controlled items, if competitive in price, service and quality. Fierce competition in institutional and commercial markets.

San Diego: Situation much like Los Angeles', but market much smaller (metropolitan population 1,125,000). Fresh fish relatively more important and apparently in adequate supply.

San Francisco: Metropolitan population 2,880,000 (including Oakland). Situation similar to Los Angeles. A production center which also receives fresh supplies of fish from Washington, Oregon and nearby Eureka, with amounts varying by season.

(c) The Southwest

Las Vegas, Phoenix-Tucson and Salt Lake City are important in this area. Large tourist consumption. Institutional markets strong.

(2) Bottomfish Purchases for the Armed Services

The Defense Subsistence Supply Agency makes steady, substantial purchases of frozen bottomfish fillets for the U. S. armed services. Purchases are limited to U. S. sources; there is no reason why an efficient Alaska bottomfishery could not compete successfully for part of the fillets bought. (West coast processors have obtained some of the west coast delivery contracts, although it is reported that they have never successfully bid for east coast-delivered fish.) In 1963, the Defense Subsistence Supply Agency purchased approximately 9,591,000 pounds of frozen bottomfish fillets 3/:

- 3,787,000 pounds of ocean perch;
- 3,030,000 pounds of flounder and sole;
- 2,087,000 pounds of haddock;
- 687,000 pounds of cod.

These figures represent 11% of all ocean perch, 17% of flounder and 23% of cod frozen fillets produced in the U. S. that year.4/

3/Published and unpublished figures from the Commercial Fisheries Review, B.C.F.

4/Packaged Fishery Products 1963 (C.F.S. 3455), B.C.F., p. 3.

3 B. STATE AND CONDITION IN WHICH FISH ARE MARKETED

We begin this Sub-section with a definition of terms describing state and condtion, which will be used during the remainder of this report:

Fillet: The all-meat slice of fish flesh obtained by filleting. Filleting is a process performed either by hand or machine, of cutting the boneless flesh away from the fish backbone on both sides. Fillets are often skinned, either by hand or machine.

#1's: One-pound putups of fillets, for retail sale. One or more fillets are blocked together in a one-pound unit, wrapped in clear plastic film (known as "cello wrap"), placed into a carton and frozen.

#5's: Five-pound master cartons containing six cello-wrapped units of fillets. They are sold either to retail or to the institution-restaurant trade. Also called "cello-wrapped fives".

#5's are also available in multiples, each containing six cello-wrapped units of fillets per five pounds, i.e. #10's, #15's, #20's and #25's.

Graded Sizes: Term refers to fillets and other processed fishery products when they are packaged in a uniform size. The size range varies from 1-2 fillets per pound, up to 12-14 fillets per pound. This uniformity of components within a fillet unit is achieved by grading to size.

Skin off-skin on: Fillets are sold either with skin on or skin off. Skin is sometimes left on because of cost, taste and identification considerations.

IQF (Individual Quick Frozen): A form in which individually frozen size-graded fillets are packed in clear plastic bags, to prescribed weights. The bags are then shipped in cardboard cartons. Sold to institutions.

Blocks and Slabs: The terms refer to frozen rectangular cubes of skinless fish fillets and bits. The fillets are "blocked" together in a combination compressing-freezing process which fuses them into a solid unit. The blocks generally weigh between 13-1/2 and 17-1/2 pounds each.

Fish Sticks: These are cut by processors from frozen fish blocks. Of uniform size--usually 3 to 3-1/4 inches long, 7/8 inch wide and 1/2 inch thick--fish sticks weigh about one ounce each, with breading on. They are packaged and sold in a frozen state, either raw or pre-cooked.

Portions: A recently developed item cut from frozen fish blocks, also called "squares" or "portion-controlled" fish squares. Generally weight 3 or 4 ounces each, breaded, but are available in weights from 1 to 5-3/4 ounces. They are packaged and sold in a frozen state, either raw or pre-cooked.

A general discussion of fillets and portion-controlled items follows:

(1) Fillets

Between 1954 and 1963, the supply of groundfish and ocean perch fillets and blocks in the U. S. increased almost 22%, from 259,939,000 pounds to 315,057,000 pounds. During that decade, however, U. S. production dropped 39,100,000 pounds (from 122,400,000 pounds and 47.1% of total to 83,300,000 pounds and 26.4% of total), while imports of fillets and blocks rose 94,200,000 pounds (from 137,548,000 pounds and 52.9% of total, to 231,728,000 pounds and 73.6% of total).5/ Of the 1963 U. S. fresh and frozen fillet production, fresh fillets accounted for 47% of the poundage and 53% of the value, while frozen fillets accounted for the remainder.6/ Imports were almost all in the frozen state.

Although still important in U. S. production, fresh fillets represent a fast-declining market, according to most in the industry. Only 4 or 5 fresh fish brokers remain active in Chicago, and only 3 or 4 in Los Angeles--mere fractions of past days. And the BCF New York Market Development representative reported that fresh fish stores in that metropolitan area have been halved--from 1,400 to 700--since World War II.

In many potential markets for Alaska bottomfish, fresh fillets are in short supply, and prices and profit-potential are higher than for frozen. However, even for nearby fresh fillet producers, sales are risky. Processing and shipment to market must be speedy, and retailers must be lined up in advance by distributors, to prevent deterioration of quality and/or spoilage. Many in the potential markets visited stated that frozen fillets (primarily Icelandic and Canadian in origin) were fresher than the "fresh fish" being sold in the same stores.

Even if quality is kept high, by the time fresh fillets reach the fish store, rapid price fluctuations often require price adjustments on the part of the processor to protect the distributor.

5/Ibid, p. 5.
6/Ibid, p. 2.

BCF's Market Development people have worked long and hard to increase the sales of fresh fish without notable success. They may have stemmed the trend-toward-frozen, to a degree, but have been unable to reverse it. With the exception of several small but efficient processors, west and east coast fresh filleters have had to concentrate upon immediate and nearby markets. They have learned by bitter experience that the supplying of far-away markets on a large scale is perilous. Alaska is much further from "lower 48" markets than present suppliers of fresh fillets. There might be luxury or specialty items for a small portion of an Alaska bottom-fishery's catch, but it is hard to see how they can become a mainstay. (See Section 3E for further discussion of this point.)

Frozen fillets offer much greater margin of safety for a new, experimental Alaska bottomfishery. It is a form which has wide acceptance throughout the key potential market areas mentioned in 3A, above, and it represents relatively stable volume in both the quantity and price. Frozen fillets are important, above all, in sales to consumers, through retailers. And as previously noted, the Defense Subsistence Supply Agency purchases large amounts, too. Major competition in the area of sales to consumers is the mass-produced, low-priced, high-quality import.

(2) Portion-controlled items, such as IQF, breaded squares and fish sticks, are an increasingly important section of the frozen fish business, especially in sales to institutions.

IQF is growing, particularly in the midwest and west, but needs further market development. Major present objections center around its high cost (many brokers and distributors report price resistance) and non-continuity of supply. However, some specialists in the field maintain that IQF's true potential has never been explored in depth; that it is still in its infancy, with tremendous potential, while frozen fillets have more limited horizons. At the beginning, a potential Alaska bottomfishery will do well to concentrate its efforts on trying to fill demand for the largest present-volume frozen form: fillets. Forceful attempts to market the as-yet small volume IQF form should await later developments.

Fish sticks and portions are a rapidly growing element in the frozen fish industry. The 1963 yield of fish sticks totalled 79,295,000 pounds, 7,078,000 pounds more than in 1962 and 30% more than the 61,011,000 pounds in 1958. Fish portion production is zooming ahead even faster; portions have risen from 21,790,000 pounds in 1958 to 78,678,000 pounds in 1962 (when they topped fish stick production for the first time), to 94,647,000 pounds in 1963--a 334% rise in 5 years.7/

7/Fisheries of the U. S. 1963 (C.F.S. 3500) p. 23

Fish sticks and portions are produced in the U.S., mostly from imported blocks and slabs of groundfish fillets. Slab and block customers (U. S. processors) do not compete directly with frozen fillet customers (wholesalers, brokers and distributors), and there are, as will be pointed out later, certain demand areas in which imported blocks are in short demand. A potential Alaska bottomfishery should attempt to determine whether it can compete with foreign blocks on a price and quality basis.

(3) Other Conditions and Forms. Categories of relatively minor potential such as smoked, salted and kippered fish, are covered in 3D, in the discussion of individual species. The major sales potential for an Alaska bottom fishery lies in frozen products.

3 C. PRESENT SUPPLIERS OF BOTTOMFISH

(1) Imports and Importers of Bottomfish

(a) Current Statistics

We have noted above that frozen fish marketed in the U. S. are predominantly imports, segments of which are U. S.-processed; further - see 3B(1) - that the import share of groundfish fillets increased from 52.9% to 73.6% of total, during the last decade.

Figure 12 shows U. S. imports of bottomfish fillets, blocks and slabs, by country, for 1963 and 1964-through-April. In the immediate past, as well as the more distant past, the bulk of imports have come from Canada (more specifically, the Canadian Atlantic Provinces). Canada was the source of 71% of imported fillets and 49% of blocks and slabs in 1963, accounting for 57% of the total of imports. In 1964-through-April, it was still predominant, with 56% of the fillet, block and slab total.

In point of fact, the expanding post-World War II U. S. market for frozen groundfish and ocean perch fillets and blocks or slabs has permitted the Canadian industry to emerge from stagnancy and to become a growth factor in the provincial economies. 1963 landings of Canadian Atlantic cod, haddock and pollock were 605,300,000 pounds, 91,400,000 pounds and 56,600,000 pounds respectively. The three-fish total catch was 753,300,000 pounds.8/

8/Daily Fishery Products Report H-75, Hampton MNS, BCF, April 16, 1964.

Figure 12. U. S. IMPORTS OF BOTTOMFISH FILLETS, BLOCKS AND SLABS, BY COUNTRY
1963 and 1964-through-April (in millions of pounds)

1963	Canada	Iceland	West Germany	Denmark	Norway	Others	Total
COD FILLETS	20.5	9.8		1.6	.6	.2	32.7
HADDOCK, ETC.* FILLETS	15.4	6.3		.7	1.2	.7	24.2
OCEAN PERCH FILLETS	16.1	.9	3.9			.6	21.5
FLOUNDER FILLETS	15.4					1.1	16.6
TOTAL BOTTOMFISH FILLETS	67.4	17.0	3.9	2.3	1.8	2.6	95.0
% TOTAL FILLETS	(71)	(18)	(4)				
TOTAL BLOCKS & SLABS	75.7	31.8	4.3	12.0	17.5	12.0	153.3
% BLOCKS & SLABS	(49)	(21)		(8)	(11)	(8)	
TOTAL FILLETS, BLOCKS & SLABS	143.1	48.8	8.2	14.3	19.3	14.6	248.3
% FILLETS, BLOCKS & SLABS	(57)	(20)	(3)	(6)	(8)	(6)	
JAN.-APRIL 1964							
COD FILLETS	7.2	4.7		.3	.2	.1	12.6
HADDOCK, ETC.* FILLETS	5.1	3.2		.3	.5	.3	9.4
OCEAN PERCH FILLETS	5.0	.5	.5			.1	6.1
FLOUNDER FILLETS	5.7					.3	6.0
TOTAL BOTTOMFISH FILLETS	23.0	8.4	.5	.6	.7	.8	34.1
% TOTAL FILLETS	(67)	(25)					
TOTAL BLOCKS AND SLABS	22.4	15.5	.8	2.2	3.3	2.2	46.3
% BLOCKS & SLABS	(48)	(33)					
TOTAL FILLETS, BLOCKS & SLABS	45.4	23.9	1.3	2.8	4.0	3.0	80.4
% FILLETS, BLOCKS & SLABS	(56)	(30)	(2)	(3)	(5)	(4)	

*Haddock, hake, pollock & cusk

Source: Daily Fisheries Products Report B-115, Boston, MNS, BCF, June 12, 1964

Statistics for Newfoundland, one of the important Atlantic provinces, show that 85% of frozen fish went to the U. S., 10% to England and 5% for home consumption and other countries.9/ Main forms were blocks and fillets, in that order. Pacific bottomfish are processed at Vancouver and Prince Rupert in British Columbia. This fishery, insignificant compared to the Canadian Atlantic fishery, concentrates on flatfish, with cod, ocean perch and lingcod as subsidiary species.

Much of the Canadian Atlantic catch is processed at Canadian subsidiaries of U. S.-owned firms. Gorton's has several plants in Canada, including Gorton Dew Company at Caraquet (frozen fillets and blocks) and Canapro Ltd. at Grindstone (by-products); Booth Fisheries has production plants at Petit de Grat and Fortune (processed cod, haddock, flounder and sole and ocean perch), and other plants at Lunenberg and Blue Rocks.

Iceland was the second most important source of imports with 18% of 1963 fillets (primarily cod and haddock) and 21% of blocks and slabs. 1964-through-April showed a relative rise in Icelandic imports, which equalled 30% of all fillets, blocks and slabs (see Figure 12).

(b) The Strength of Import Competition

To see why imports have taken such a large share of the U. S. bottomfish market and why they continue to do so, we note some comments of a recent study of the Canadian industry:

> "In general, the New England (bottomfish) industry 10/ is composed of a large number of small firms solely engaged in either operation of vessels or in processing. Although a few (New England) firms are engaged in both functions, they are nonetheless not vertically integrated. Thus the vessel owner sells to an independent processor; the price, in large measure, being determined by the forces of supply and demand. The industry in the (Canadian) Atlantic Provinces, however, is characterized by a few large vertically-integrated trawler-owning processing firms which are able to exert a great deal of influence on price. In effect, the processor is 'buying' from himself. When he buys the catch of vessels other than his own, he also can exert a downward pressure on the price paid because of his concentrated buying power."11/

9/Newfoundland Fisheries Review 1963.

10/These comments apply equally as well to the U. S. west coast bottomfishery.

11/The Groundfish Industries of New England and Canada, Lynch et al., Boston College, (Fish and Wildlife Service Circular 121) 1960, p. 76.

"A further major difference between the two industries lies in the organization of New England fishermen and the complete lack of organization in the Atlantic Provinces. Union requirements as to lay arrangements, layovers and broker payments tend to make costs on New England trawlers more inflexible. Furthermore, labor--the largest element of cost--is not very amenable to wage reduction. The Canadian industry, however, insulated from labor organization by law and located in an area of labor surplus, is completely unfettered by such union requirements."12/

"Canadian fishermen are eligible for a subsidy, to help them purchase new vessels. When these subsidized vessels sell to processing plants which operate their own trawlers, "the price at which they sell is the same as that at which the processors buy from their own boats. It is economical for the processors to buy much of their requirements from the independent operators, (for) the overhead costs of additional trawlers are thereby saved. To the extent, therefore, that the government subsidy is used to cover costs that the processor would otherwise have to incur, and to the extent that this subsidy permits the independent fishermen to accept a price lower than would otherwise be possible, the Canadian fish processor has a distinct competitive cost advantage over his New England rival."13/

(c) Tariffs and Quotas

U. S. fish processors are afforded some protection from foreign competition through tariffs and quotas. In the bottomfish area these devices include:

a - Blocks and slabs (over 10 pounds): Tariff of 1¢ per pound

b - Groundfish and Atlantic Ocean perch fillets: Tariff of 1.875¢ per pound, under quota; 2.5¢ per pound, over quota.14/

c - Other fillets, including flounder and sole, and Pacific Ocean perch: 1.5¢ per pound, tariff.

d - Fish sticks and portions: 20% tariff if neither cooked nor in oil; 30% for other conditions.

12/Ibid, p. 77.
13/Ibid, p. 22.
14/The reduced-tariff quota is announced annually by the Bureau of Customs. During recent years it has been declining. In 1962 it was 28,571,000 pounds; in 1963, 24,875,000. 1964's reduced-rate import quota is 24,862,000--0.3% less than 1963's.

Segments of the U. S. fishing community are vocal in their demands for extension and increase of home industry protection. However, even now, at the "Kennedy round" of trade agreement discussions with the European Economic Community, all the above items except (b) are subject to possible reduction. Items (c) and (d) may be cut in half, while the block and slab tariff (a) may be eliminated.

Whether or not reductions of tariff and quota restrictions do take place, the facts are clear: the U. S. east coast and west coast bottomfisheries, as presently constituted, are not only non-competitive - if imports ceased tomorrow, they could fill only a small fraction of U. S. demand.

> "Although many New England producers lay the blame for their economic distress on Canadian (N.E. and other) competition, almost all admit the need for Canadians to supply at least some of the U. S. demand. Canadians would not be in a position to furnish such supplies were not the American market large enough and free enough to justify their investment in vessels and processing plants."15/

> In addition, as Charles E. Jackson, Legislative representative of the National Fisheries Institute, stated recently: "If we did anything to stop imports at this time, our processors would be unable to secure sufficient fish to meet the American needs... many would have to go out of business."16/

(2) Shipments to Potential Markets from U. S. and Foreign Suppliers

Statistics are spotty and sparse concerning the current shipments, supplies and consumption of bottomfish in the three market areas and twelve cities mentioned in Section 3A(1) as potentially important commercial markets. In only three cities west of the Mississippi--Chicago, Seattle and San Pedro--are Fishery Products Reports of the BCF Market News Service published. And of the three, only Chicago's is basically a marketing report; Seattle's and San Pedro's are concerned chiefly with production statistics. Chicago's Reports show receipts as reported by wholesalers, but provide no breakdown of distribution from that point on.

15/Ibid, p. 31.
16/Hearings before the Merchant Marine Fisheries Subcommittee of the U. S. Senate Committee on Commerce, April 25, 1963, p. 151.

As a result of the above, identification of potential market by species, condition and quantity, by city and area, must rely to an important degree upon opinion and guess, as well as evaluation of available figures... especially in view of the fact that, with increasing decentralization of fish products marketing patterns and the by-passing of regional wholesalers, the large U. S. cities (those generally in which Market News Service publications are issued) are playing less significant roles.

The following resume is based in the main on some salient characteristics of the 1963 Chicago bottomfish market, as obtained from distributor discussions and from various publications of that city's BCF, Market News Service staff. Analysis of similar publications from the large east coast markets of New York and Boston indicate that the trends evident in Chicago are not unique. Sub-section 3D (following) presents, by species, an evaluation of current market characteristics for important members of the northeast Pacific bottomfish community.

(a) The Midwest. Chicago receipts of salt-water fish, as reported by wholesale dealers, have decreased from 32,005,800 pounds in 1956 to 18,765,000 in 1963--a seven-year drop of 41.4%! The "receipts" figure includes all arrivals by rail and truck, and some of the quantitatively small air shipments. They do not include local cold-storage withdrawals or direct shipments to hotels, restaurants, chain super-markets and other retailers (the latter figures are unavailable).

Receipts of fresh bottomfish fillets at Chicago totalled an insignificant 5,300 pounds in 1963. Of these, 2,600 pounds were Atlantic cod from Massachusetts; 2,100 pounds were flounder and sole from the same state, and 600 pounds were Pacific sole from Washington.

Chicago receipts of frozen bottomfish fillets were much more sizeable in 1963; included:

> 3,634,900 pounds of ocean perch (2,253,300 from Massachusetts, 238,100 from other east coast states, 877,100 from eastern Canada, and 266,400 pounds of Pacific Ocean perch--164,300 pounds from British Columbia and 102,100 from Washington and Oregon).
>
> 1,294,500 pounds of flounder and sole (including 427,000 from Massachusetts, 255,600 from New York, 362,600 from eastern Canada, and 191,100 from the west--111,800 pounds from British Columbia and 76,300 from Washington and Oregon.
>
> 1,003,200 pounds of cod (all from the east coast and from eastern Canada). Two-thirds of the receipts from U. S. points originated in Massachusetts, none from the Pacific coast.

924,100 pounds of haddock (all from the Atlantic; the fish is not found in the Pacific).

93,900 pounds of pollock (70% from Massachusetts; the remainder from Nova Scotia).

During the year, Chicago received 295,700 pounds of unique-to-the-Pacific sablefish (109,200 from Washington-Oregon-California, 58,100 from Alaska, 61,300 from British Columbia, and 67,100 from New York (!)).

Frozen fish sticks receipts were 938,600 pounds--chiefly from St. Louis and Kansas City in Missouri (456,000 pounds) and Massachusetts (391,100 pounds). Chicago frozen portion receipts were 251,100--a gain from Missouri (194,400 pounds) and Massachusetts (49,100 pounds).

The above figures reveal the limited nature of present west coast penetration of the Chicago market. Receipts of frozen west coast bottomfish totalled 686,100 pounds. The 457,500 pounds of west coast frozen fillets amounted to somewhat less than 7% of the five kinds noted above. A number of the other potential midwest market cities have no first-hand knowledge of the Pacific varieties.

During our field research, we interviewed a number of processors who reported limited sales to the midwest. A high-quality, high-price Astoria filleter told of continually increasing fresh shipments to Chicago, Saint Louis, Kansas City and Columbus, via United Airlines. Others in Prince Rupert, Seattle and Bellingham reported sales of frozen sole fillets in Detroit, Omaha, Saint Louis and Kansas City, in addition to Chicago. Once again the quantities involved were small--fractions of the west coast poundage reported for Chicago, above. Puget Sound's present over-supply of bottomfish (Section 1A) is but one indication that the small present market penetration is the result of competitive difficulties, rather than lack of interest in midwestern sales.

(b) The West Coast and Southwest. Discussions with distributors on the west coast revealed that substantial amounts of bottomfish landed in Washington, Oregon and British Columbia are shipped to the Los Angeles area and southern California. Shipments include fresh and frozen fillets of flounder and sole, some ocean perch and lingcod fillets, and sablefish. The full nature and extent of the present California market for northeastern Pacific bottomfish, however, remains to be measured; overall statistics are lacking. The same is true for the southwest, which also receives some shipments of fresh and frozen Pacific bottomfish.

An indication that some unfilled market potential exists in the west for competitive Pacific bottomfish is apparent from the following figures covering imports into the California and Arizona Customs Districts in 1963:

648,100 pounds of frozen cod fillets (from Norway and other European countries); 139,200 pounds of frozen sablefish from Japan; 33,600 pounds of sole fillets from Europe; 2,228,600 pounds of cod blocks and slabs and 16,300 pounds of flounder blocks and slabs (both types from Europe).17/

3 D. POTENTIAL BY SPECIES AND MARKET

This Sub-section summarizes recent catch and marketing trends of species which are represented in or are competition to the northeastern Pacific bottomfish community. The individual summaries provide the background of fact and opinion upon which marketing projections, later in this report, are based.

We again stress the inadequate character of available statistics and records. Unless otherwise identified by specific footnotes, the figures cited herein are based upon information in publications of the Bureau of Commercial Fisheries which are listed at the end of this Sub-section.

We have noted in Chapter 3B(1) that U. S. production of groundfish and ocean perch fillets decreased from 122,400,000 pounds in 1954 to 83,300,000 pounds in 1963--a drop of 32% in the decade; further, in Chapter 3C(2), that Chicago receipts of salt water fish (overwhelmingly handled in the frozen state) dropped 41% during the seven years from 1957 to 1963.

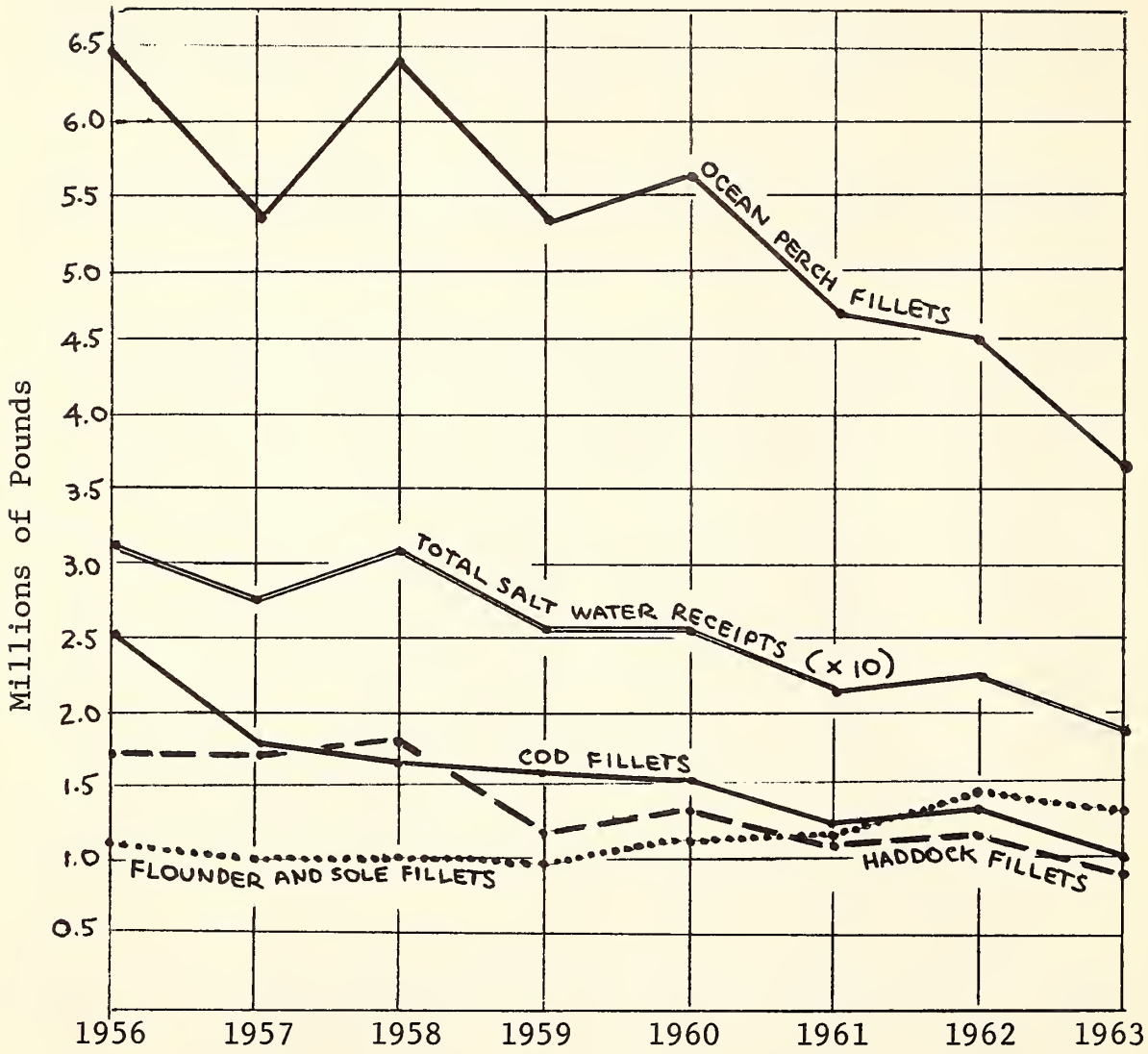
Figure 13 presents a bottomfish-oriented breakdown of this seven year trend and shows recent trends in the largest single potential market (Chicago) for Alaska bottomfish for the key ocean perch, flounder and sole, cod and haddock categories. Frozen ocean perch fillets have been by far the most important bottomfish category, varying from 6,543,500 pounds to 3,634,900 pounds during the period. Cod fillets, second most important until 1962, varied from 2,552,500 pounds to 1,003,200 pounds. Flounder and sole fillets have varied between 986,900 pounds (in 1959) to 1,431,900 pounds (in 1962). Of the three, only flounder and sole represent an upward trend. Figure 13 also shows receipts of haddock, a groundfish that is related to cod. The trend for this Atlantic species has been downward, from a 1957 high of 1,763,700 pounds to a seven year low of 924,100 pounds in 1963.

Other salt water bottomfish shipped to Chicago during the period included sablefish, some pollock fillets and the tiny amounts of fresh flounder and sole fillets. In aggregate, however, they were relatively unimportant, accounting for 395,000 pounds in 1963.

17/California Fisheries Annual for 1963, Market News Service, San Pedro, pp. 17 and 18

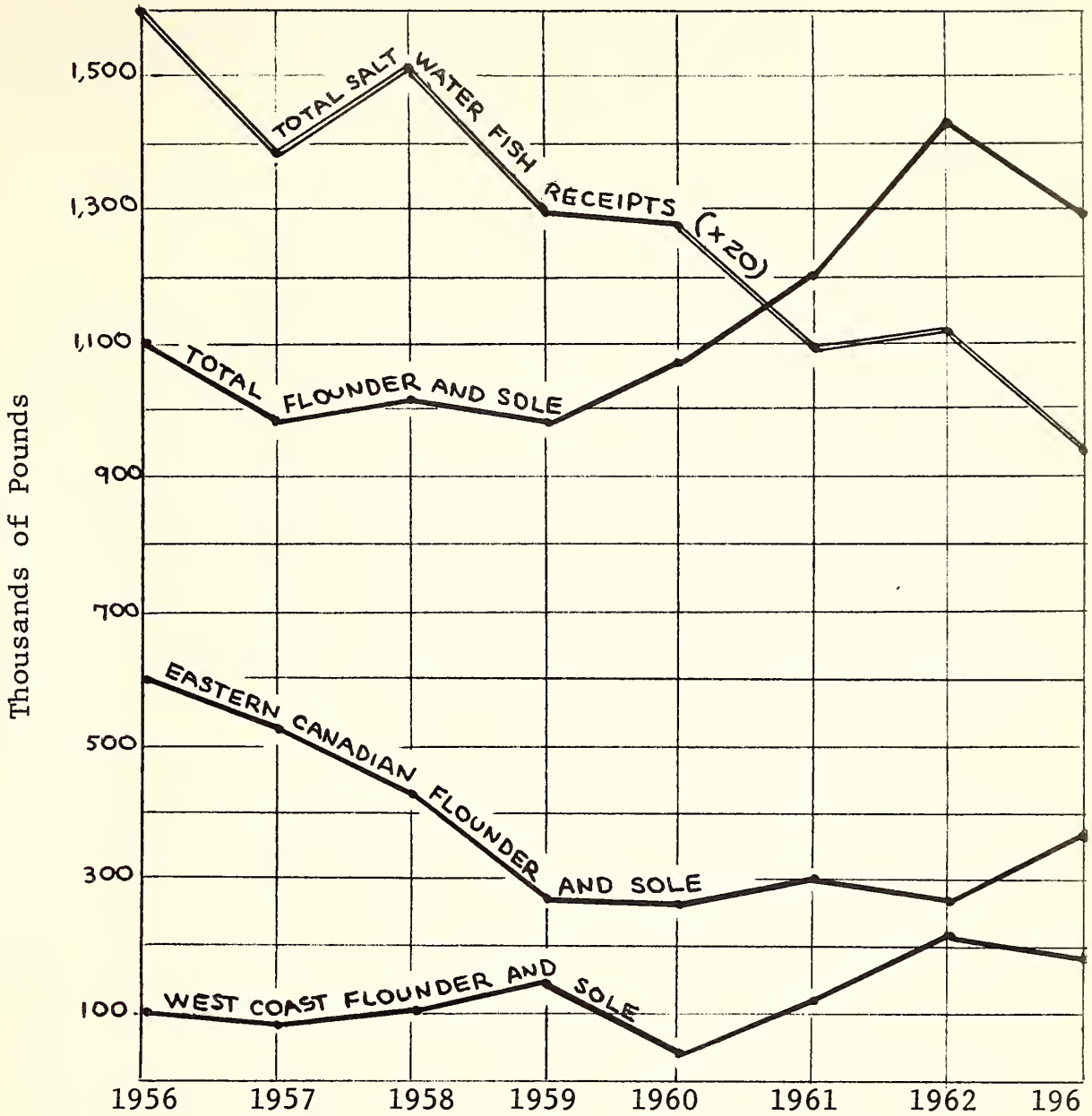
FIGURE 13.

FROZEN SALT WATER FISH RECEIPTS AT THE
CHICAGO WHOLESALE MARKET, 1956-1963



Source: 1956 to 1963 Annual Summaries of Receipts and Prices of Fishery Products at Chicago, MNS.

FIGURE 14- FROZEN FLOUNDER AND SOLE FILLET RECEIPTS AT THE CHICAGO WHOLESALE MARKET, 1956-1963



Source: 1956 to 1963 Annual Summaries of Receipts and Prices of Fishery Products at Chicago, MNS.

(1) Pacific Flounder and Sole

The 1962 U. S. flounder and sole catch was a record 155,329,000 pounds. Of that figure, two-thirds (104,454,000 pounds) represented Atlantic and Gulf species; the remainder were from the Pacific. The Atlantic catch has been rising rapidly during recent years, with the large increases in landings of Yellowtail flounder (82,600,000 pounds in 1963). The U. S. Pacific catch of flounder and sole has been much steadier--totalling 47.7, 46.4 and 50.9 million pounds during 1960, 1961 and 1962, respectively.

In 1961 U. S. fresh flounder and sole fillet production was 21,345,000 pounds, while frozen fillet production was 10,311,000 pounds. Both of these figures rose in 1963 and reached 28,379,300 pounds and 15,744,200 pounds respectively. Chicago receipts of frozen flounder and sole fillets have also reflected this upward trend, having risen from 1,107,600 pounds in 1956 to 1,431,900 pounds in 1962 (1963's total of 1,294,500 pounds represents a drop from this latter figure). Figure 14 shows that receipts of west coast flounder and sole at Chicago, while a small proportion of the total, have reflected the overall trend, rising to a 1962 peak of 209,100 pounds, and dipping somewhat to 191,100 pounds in 1963. On the other hand, Chicago receipts from eastern Canada have shown a general decrease during recent years--dropping from a 1956 high of 602,600 pounds to 264,100 pounds in 1962. The eastern Canadian trend shows an inverse relationship of sorts with the west coast figure, even to the extent of rising in 1963, when west coast frozen sole fillets decreased.

Figure 15 breaks the west coast total into components; reveals the relative importance of receipts from Washington, Oregon and Alaska compared to those from British Columbia, which represents keen competition.

Figure 15. FROZEN FLOUNDER & SOLE FILLET RECEIPTS AT CHICAGO
(thousands of pounds)

Origin	1960	1961	1962	1963
Washington, Oregon and Alaska	27.1	66.3	62.1	79.3
British Columbia	25.0	55.6	147.0	111.8
Total west coast	52.1	121.9	209.1	191.1

Source: 1960-1963 Annual Summaries of Fishery Products Receipts and Prices, Chicago, MNS.

The 1961 Washington, Oregon and California production of flounder and sole fillets was 8,615,000 pounds; 4,725,000 in the fresh state and 3,890,000 in the frozen state. The above-listed Chicago receipts figure (66,300 pounds) indicates that somewhat less than 2% of the latter figure reached that city.

As noted in Chapter 3A(2), the Defense Subsistence Supply Agency is an important purchaser of frozen flounder and sole fillets; it bought 3,030,000 pounds of flatfish in 1963.

Although Washington is, by far, the largest U. S. west coast producer of frozen flounder and sole fillets, it is interesting to note that 54% of Seattle's 1963 frozen sole receipts of 430,000 pounds, and 61% of Seattle's 1962 frozen receipts of 620,000 pounds were imported from British Columbia (the remainder coming from "local" producers). 18/ This is further evidence of the competitive nature of British Columbia production--even in the heart of Washington.

National cold-storage holdings of frozen flounder and sole fillets totalled 2,640,000 pounds on May 31, 1964--approximately 50% more than on the comparable date in 1963. Washington and Oregon cold-storage holdings of frozen sole fillets were 377,000 pounds at the end of March 1964--more than triple the 109,000 pounds on the comparable date in 1963; Chicago area holdings were 222,800 pounds on July 23, 1964, compared to 235,600 pounds one year previous.

There is general agreement among fish distributors and others in the industry, as well as among BCF personnel, that flatfish represent the most commercially-marketable segment of the northeastern Pacific bottomfish community and a projected Alaskan bottomfishery. These comments were heard from Gloucester to Chicago, to Los Angeles - in practically all the cities visited by the Wolf Management Services team. As has been noted, flounder and sole catch and shipments have both been rising. Yet, in some west coast areas visited, flatfish were reported in short supply, and in Chicago several distributors claimed that they could not fill existing demand for Pacific sole.

The main problem in the midwest appears to be the difficulty of Pacific sole to compete in price and quality with shipments from Canada and the east coast (we are here referring to frozen sole fillets, the chief form in which the fish is marketed in the area). Concern was also voiced over the difference in taste between Atlantic and Pacific varieties of sole (most noting that customers preferred the former), and the difficulty of educating people into new taste habits in a competitive market.

Those in the institutional trade maintained that there was great potential for sole IQF; some stating that the true extent of the IQF market had not yet been determined.

18/1963 Annual, Seattle Landings and Receipts, MNS, Seattle.

(a) Dover Sole

Dover sole has been traditionally the most-caught and most-marketed of the Pacific flatfish family. Between 1956 and 1960, west coast landings averaged 15,940,000 pounds (see Figure 9). Since it also dominated exploratory flatfish catches off Washington-Oregon and was the second most important flounder off British Columbia-Southeast Alaska (see Chapter 2B(4)), it is evident that Dover sole is the most important commercial flatfish in the northeastern Pacific, featuring both availability and an existing market.

West coast Dover sole was found throughout the midwest in both frozen fillet and IQF forms; the former being sold as a promotional item (with reports of mixed results), and the latter being sold to good-quality restaurants. It is known in Indianapolis, Saint Louis, Kansas City, Milwaukee, Detroit and Chicago, among other cities. Chief complaints were its high cost and uncertain supply.19/

Almost half of west coast-landed Dover sole is caught off California (Figure 9). However, Chicago flounder and sole receipts by state do not indicate that any of this reaches the area. BCF personnel in California maintained that fresh and frozen Dover fillets were overproduced and a drug on the local market.

(b) English, Petrale and Rex Sole

These three species represent most of the remaining commercially-important northeast Pacific flatfish sold for human consumption. 1956-1960 west coast landings of English sole averaged 13,220,000 pounds, not far below Dover sole. During the same period, Petrale and Rex sole landings averaged 8,780,000 pounds and 3,460,000 pounds, respectively. BCF exploratory surveys indicate that all three species are abundant in the northeast Pacific, with English and Petrale catch rates highest off British Columbia-Southeast Alaska (Figures 4 and 5).

English, Petrale and Rex sole are more or less known in the midwest, although to a lesser extent than Dover. Comments concerning the three were similar to those noted above for Dover sole--with stress placed on the potential for properly graded, properly merchandised IQF portions in the institutional trade. However, unlike the above-noted west coast negative reaction to potential for Dover sole, California distributors reported that English, Petrale and Rex are popular and often in short supply. As indicated previously, much of the California flatfish market is fresh.

19/Wolf Management Services researchers noted some demand in the midwest for imported fresh European Dover sole, a top-quality, entirely different species from the identically-named Pacific Dover sole.

(c) Other Pacific Sole of Minor Commercial Importance

Rock sole was found by exploratory surveys to be important on the inner shelf and in all inside areas of the northeast Pacific (and comprising 22% to 47% of the flounder catch in the Gulf, Bering Sea and Peninsula). It is, however, all but ignored by U. S. west coast fishermen (who land 5,000 pounds or so annually), but is exploited by British Columbia trawlers, which landed average catches of 4,370,000 pounds between 1956 and 1960. Canadians 20/ report that the Rock sole's flesh is very palatable; almost as good-tasting as English sole. During our survey, we found no evidence that the species is marketed in the mid-west.

Starry flounder, dominant on the inner shelf of the Gulf of Alaska and found in some quantity throughout the northeastern Pacific, averaged landings of 2,221,000 pounds between 1956 and 1960, with somewhat less than half caught off British Columbia.

Turbot (see 2B(4)) is the dominant flatfish of the northeastern Pacific from Oregon to the Alaska Peninsula. It accounts for 43% to 91% of total flatfish catches (by weight) in all over-49 fathom depth zones in the British Columbia-Southeast Alaska, Gulf and Peninsula regions. It is, however, marketed but little, except as mink feed. 1956-1960 west coast landings averaged 5,680,000 pounds, with 60% of the total caught off British Columbia. If it could be processed into fish meal at a competitive price, there might be a large potential market for Pacific turbot. (Again, this species has few characteristics in common with the similarly-named European turbot, which is an excellent food fish.)

We estimate that between 60% and 65% of total marketable production of an Alaska bottomfishery might be Pacific sole; with Dover sole accounting for between 45% and 50% of total production, and English and Petrale accounting for approximately 10% and 5%, respectively. We project four-fifths of Pacific sole sales in the form of #5 frozen fillets, the remainder as IQF.

(2) Pacific Ocean Perch

The 1962 U. S. ocean perch catch was 141,310,000 pounds. Of that figure, 123,983,000 pounds represented the Atlantic species, while 17,327,000 pounds came from the Pacific.

20/Fishes of the Pacific Coast of Canada, Bulletin #68, Fisheries Research Board of Canada, 1961.

The Atlantic catch has been declining precipitously during recent years; the 1963 total of 108,300,000 pounds was the lowest in over 20 years, and represented a bare 42% of the 1951 catch. Through July 11, the 1964 New England catch of Atlantic Ocean perch is 32% under the comparable 1963 date.21/ Because much of this continuing decline represents decreasing stocks of ocean perch on the eastern slope of the Grand Bank, Canadian landings of this species have shown a similar downward trend. Decreasing productivity has been the net result of the intensive fishing efforts combined with slow replacement of the resource, because of the long period of maturity for ocean perch. Earlier catches of large fish have been replaced mainly by relatively small young fish, adversely affecting marketability.

On the other hand, Pacific Ocean perch landings, while still small in comparison to Atlantic landings, are increasing rapidly. The 1962 landings of 17,327,000 pounds represented record production...40% over the 1961 landings of 12,443,000 pounds, which in turn were 40% over the 1960 landings of 8,842,000 pounds.

From 1961 to 1963, U. S. production of fresh Pacific Ocean perch fillets rose from 1,879,800 pounds to 2,598,800 pounds; while production of frozen Pacific Ocean perch fillets jumped even more sharply, from 1,864,200 pounds to 4,255,817 pounds. Once again, these were fractions of the amount of Atlantic Ocean fillets produced, but their rapid rise is of definite significance for a potential Alaska bottomfishery.

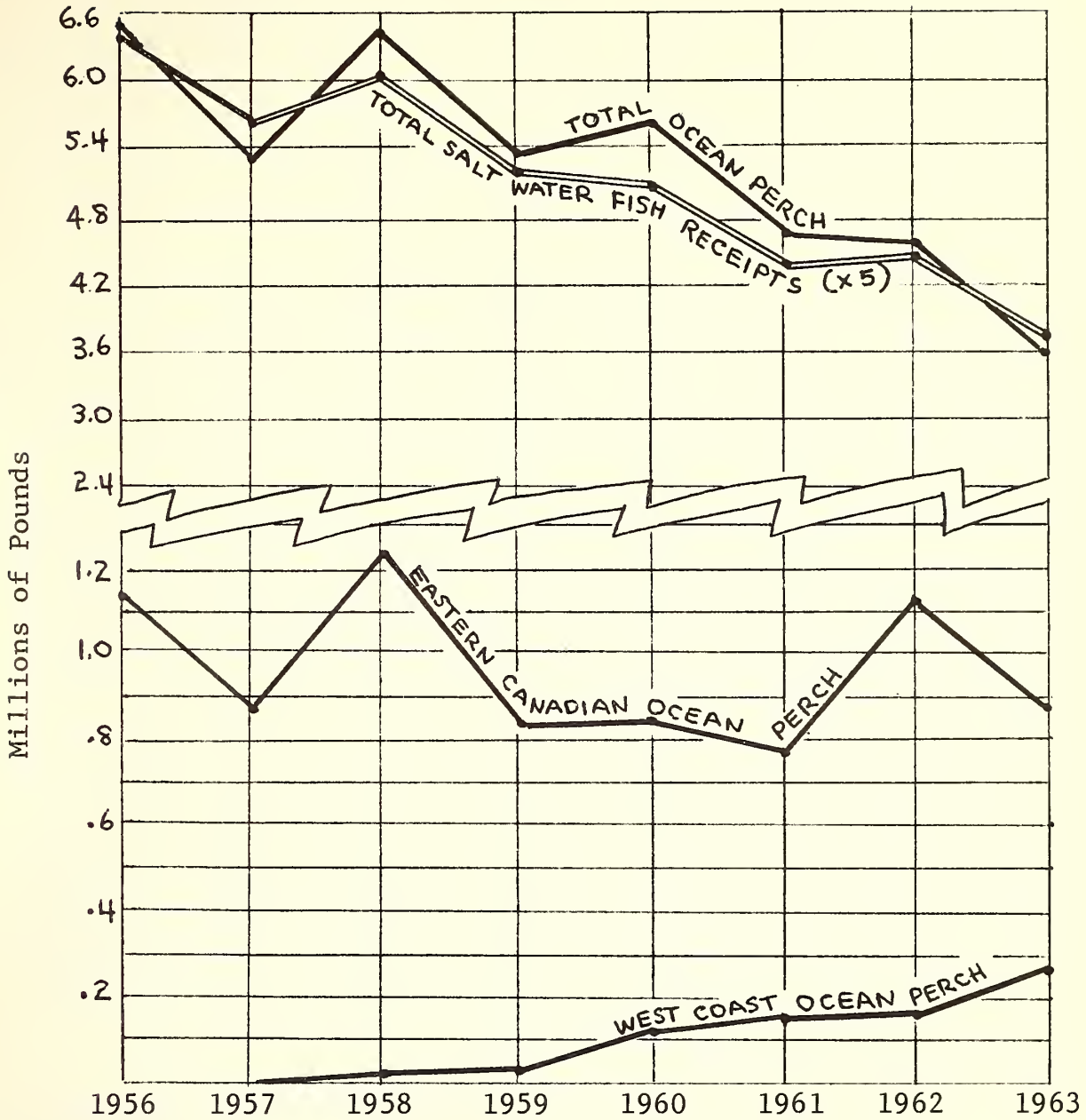
Chicago receipts of frozen ocean perch fillets dramatize the contrasting east and west coast trends. Figure 16 shows a steady drop of total ocean perch receipts--from 6,543,500 pounds in 1956, to 3,634,900 pounds in 1963. That the decrease in shipments has come from New England is shown by the fact that receipts from eastern Canada have about held their own (they fluctuated between 1,231,400 pounds and 789,800 pounds), while receipts of frozen Pacific Ocean perch fillets from the west coast have skyrocketed from zero in 1957 to 266,400 pounds in 1963. The performance of Pacific Ocean perch is all the more remarkable when we consider that the Chicago receipts figures are distorted by short cuts that bypass that city's wholesale market. It will be recalled that total Chicago receipts of salt water fish dropped 40.1% between 1956 and 1963.

Figure 17 reveals the relative importance of receipts from Washington-Oregon and from British Columbia; shows that both areas found constantly rising markets in Chicago between 1958 and 1963, and that this trend has continued unabated into 1964.

21/Fishery Products Report B-136, Boston, MNS. July 14, 1964.

FIGURE 16.

FROZEN OCEAN PERCH FILLET RECEIPTS
AT THE CHICAGO WHOLESALE MARKET, 1956-1963



Source: 1956 to 1963 Annual Summaries of Receipts and Prices of Fishery Products at Chicago, MNS

Figure 17. FROZEN PACIFIC OCEAN PERCH FILLET RECEIPTS AT CHICAGO (thousands of pounds)

Origin	1959	1960	1961	1962	1963	1963 thru May	1964 thru May
Washington-Oregon	31.9	95.5	61.8	60.0	102.1	22.1	81.8
British Columbia	--	21.6	96.6	106.7	164.3	62.5	81.9
Total west coast	31.9	117.1	158.4	166.7	266.4	84.6	163.7

Source: Annual and Monthly Summaries of Fishery Products Receipts and Prices, Chicago, MNS.

- - -

1964-thru-May Pacific Ocean perch receipts at Chicago, 163,700 pounds, were almost double the comparable 1963 figure, in spite of a 19% drop in overall receipts of ocean perch, to 1,201,100 pounds. In 1964, for the first time, Pacific Ocean perch fillet receipts are running over 10% of total ocean perch receipts.

The State of Washington is a large producer of frozen Pacific Ocean perch fillets, and has been shipping increasing quantities to other markets, including Chicago, as noted above. It is ironic then to note that Seattle has been receiving increasing amounts of Atlantic Ocean perch from Massachusetts. It received 164,000 pounds from Massachusetts in 1962, 199,000 pounds in 1963, and receipts for 1964-thru-May have totalled 111,400--up 73% from the 72,600 pounds received in the comparable 1963 period.

The Defense Subsistence Supply Agency, as noted in Chapter 3A(2), is a very large purchaser of ocean perch, buying 3,787,000 pounds in 1963.

U. S. cold-storage holdings of frozen ocean perch fillets were 8,381,000 pounds on June 30, 1964--down 706,000 pounds from the level of June 1963. This represents the first time since April 1962 that month-to-month holdings have shown a decrease. As of the end of March 1964, Washington-Oregon holdings of Pacific Ocean perch were 503,000 pounds--somewhat more than double the 232,000 holdings for the comparable 1963 date. Chicago area holdings of ocean perch were 427,600 pounds on July 23, 1964, compared to 405,100 pounds the previous year.

The rapidly increasing figures for both Pacific Ocean perch landings and frozen fillet shipments to Chicago indicate that it can be a key product of an Alaskan bottomfishery, especially in the midwest where ocean perch is well known.

Despite the fact that most in the industry compared it unfavorably with flounder and sole, and felt that its long-range potential was more circumscribed, Pacific Ocean perch shows evidence that it can fill at least part of the huge gap in production now being experienced by a faltering Atlantic Ocean perch industry. Pacific Ocean perch are much larger in size than their Atlantic cousins, which as previously noted are getting progressively smaller (and therefore harder and less economical to handle and process).

The major distributor objection to ocean perch revolves around its reportedly strong taste and smell. Ocean perch does have a dark, oily streak near the skin which makes it more perishable than the less oily, white skinned cod and haddock species, as well as flounder and sole. But extensive discussions with processors, distributors and others in the industry lead us to believe that the strong taste and smell are as much the result of improper handling and consequent deterioration, as they are characteristics of the fish itself. With greater oil content, rancidity will occur faster with ocean perch than many other fish, if the fishing vessel stays at sea too long, if the period between landing and filleting and freezing is excessive, and if the fish is stored improperly or too long.

The fact that ocean perch are usually sold "skin-on" does not help the matter either, for the skin imparts a "fishy" taste, too. It has been reported that the increasingly small size of Atlantic Ocean perch prevents skin-removal marketing experiments. There is no reason, however, why the much larger Pacific Ocean perch fillet cannot be sold "skin-off", with a correspondingly better taste and longer pre-spoilage life.

Midwestern fish distributors reported that Pacific perch is generally oilier and stronger-tasting than the Atlantic species and has difficulty competing with it. We attribute much of this to inferior handling by the less advanced methods of the west coast fishermen and processors. We have no way of measuring the extent to which a modern, well-organized Alaska bottomfishery can reduce the validity of these objections by improving and speeding up the marketing process; but desirable Pacific products can certainly exploit the gap now being left by Atlantic Ocean perch. With a product that many consider inferior, Pacific Ocean perch is now making giant marketing strides--even in Chicago, where competitive Great Lakes Yellow perch has been making a dramatic comeback. Because of strong present objections, Pacific Ocean perch sales by an Alaskan bottomfishery may be more problematical and difficult than Pacific sole sales, but the species does represent one of the strongest weapons in the northeastern Pacific bottomfish arsenal.

The northeastern Pacific Ocean perch resource is huge. In exploratory surveys, at depths between 100 and 199 fathoms, it accounted for 34% to 47% of the bottomfish catch in the Oregon-Washington region, 47% to 55% of the bottomfish catch in the British Columbia-Southeast Alaska region, 19% to 32% in the Gulf region, and 5% to 19% in the Peninsula region (see Figure 3). Its catch rate in the British Columbia-Southeast Alaska region was more than three times the combined total of Dover, English, Petrale and Rex sole.

As noted in Section 2B(5), the standing crop of ocean perch in the northeastern Pacific is 1.163 billion pounds--ample to satisfy a greatly increased demand, if the species can be marketed competitively.

Midwestern sales of Pacific Ocean perch presently center around frozen fillets (#1's and #5's, cello wrapped, many size-graded 4-6/lb and 6-8/lb) and IQF, for which demand is growing. IQF's higher price, however, requires stronger selling efforts. Most Pacific Ocean perch is received "skin-on", but several processors are shipping "skin-off".

We estimate that Pacific Ocean perch might account for 20%-25% of total marketable production of an Alaska bottomfishery; half in the form of #5 frozen fillets and half as IQF.

(3) Other Northeastern Pacific Bottomfish

Although resource availability and recent catch and distribution trends indicate that the chief volume products of an Alaska bottomfishery will be flatfish and Pacific Ocean perch, there are other northeastern Pacific bottomfish which have subsidiary potential in greater or lesser degrees. These, discussed briefly below, include sablefish, other rockfish, Pacific cod, lingcod, Pacific pollock, Pacific hake and dogfish.

(a) Sablefish

Sablefish is found only in the Pacific, where it is an important species in the U. S. and Canadian commercial trawl and line fisheries from California to the Bering sea. It is considered one of the best smoked fishes; its high oil content limits somewhat its sale in the fresh state.

Large year-to-year catch fluctuations are normal. The 1962 U. S. sablefish catch was 8,859,000 pounds--17% above the 1961 figure of 6,704,000 pounds, but far under 1960's 11,325,000 pounds. Peak sablefish catch was 17,750,000 pounds in 1945.

Sablefish is one of the few fishes which possess the quality of maintaining--even improving--its quality in frozen storage. 1963 total west coast freezings were 3,615,000 pounds--somewhat under 1962's 3,911,900 pounds.22/ Most of the freezings take place in the Puget Sound-Washington coast and Alaska areas.

22/1963 Pacific Fisherman Yearbook

Sablefish is processed three different ways: it is smoked, kippered and salted. In 1960 and 1961, 3,107,000 pounds and 3,169,000 pounds respectively were smoked; 214,000 pounds and 220,000 pounds respectively were kippered; and 87,000 pounds and 151,900 pounds were salted.

The Chicago wholesale market receives frozen dressed and round sablefish. Receipts have been continually declining; dropped steadily from over the 1,000,000 pound mark in the late 1940's to 310,100 pounds in 1962. 1963's frozen sablefish receipts fell to 295,700. The seven-year drop of 57% in receipts between 1956 and 1963 was substantially more then Chicago's overall 40% drop in receipts of all salt water fish during the same period.

Chicago, however, continues to be an important segment of the frozen sablefish market. The above-quoted 1962 and 1963 receipts each accounted for about 8% of total west coast freezings. Of 1963's receipts, 57% (167,500 lbs.) originated in the west coast states (including Alaska), 20% came from British Columbia, and 23% (67,100 lbs.) came from New York (undoubtedly from storage stocks originating elsewhere... as noted, this fish is not found in the Atlantic).

Washington-Oregon-Alaska cold-storage holdings of frozen sablefish were 490,000 pounds on March 31, 1964--down 389,000 pounds from the level of March 31, 1963. In Chicago, however, the story was different: on July 23, 1964, the holdings of 157,700 were many times over the 20,400 pounds for the comparable 1963 date, and were only 9,800 pounds under the total 1963 receipts. Sablefish appears to have backed up in the Chicago area, at least for the moment.

Sablefish is an important roundfish of the northeastern Pacific. It was taken in all regions south of the Alaska Peninsula by exploratory vessels and was found in all depth zones sampled. South of Cape Spencer, it was the principal roundfish (exclusive of ocean perch-rockfish) at over-200 fathoms (see Chapter 2B(6)).

The backup of sablefish at Chicago is, in large measure, the result of the recent midwest botulism scare. Distributors in that area feel that although there will always be a fair amount of smoked sablefish sold, the overall potential for the fish is definitely limited, and that it will take some time for its sales to recover.

We estimate that frozen, whole dressed sablefish might account for approximately 4% of total marketable production of an Alaska bottomfishery.

(b) Rockfishes other than Ocean Perch

In addition to Pacific Ocean perch, the northeastern Pacific, as we have noted, contains many other species of rockfishes. U. S. catch of these exclusive-to-the-Pacific fishes totalled 27,286,000 pounds in 1960, 24,882,000 pounds in 1961 and 27,980,000 in 1962, over and above

the ocean perch totals. The average 1956 to 1960 rockfish catch was 24,950,000 (see Figure 9), including those caught off British Columbia. 40% to 50% of the annual landings are caught off California where they enjoy a large fresh market.

U. S. 1961 production of fresh rockfish fillets was 3,143,800 pounds; production of frozen rockfish fillets was 917,800 pounds--less than a third of the fresh figure. By 1963, both figures had risen: fresh fillets to 3,502,000 pounds, and frozen fillets to 1,378,000.

Few, if any, rockfish fillets are recorded as reaching the Chicago wholesale market at present. That city's MNS records show last measurable receipts in 1950. From the above frozen rockfish fillet figures, however, it can be seen that sales are being made in other areas. The Defense Subsistence Supply Agency bought a relatively small 45,500 pounds of frozen rockfish fillets in 1963.

We found traces of rockfish sales in IQF form in several cities in the midwest, and a processor in Saint Louis reported excellent demand for the item.

In Chicago and elsewhere, though, most comments were negative, stressing fishy taste. Rockfishes are hard to freeze properly and reportedly deteriorate quickly (even faster than ocean perch). Again, many of the complaints may be due more to improper handling of the frozen product than to the intrinsic character of rockfishes themselves. Whatever the reason, professional merketing and promotion will be needed to raise sales to a significant degree.

Although most rockfishes are sold fresh, either filleted, whole or sliced, and fresh enjoys an excellent reputation, their main fresh market is in California, where they are landed locally. Although rockfishes are found in quantity off Alaska, it is doubtful that a fresh Alaska-caught product can compete to any great extent with California-caught rockfish.

Washington-Oregon cold-storage holdings of frozen rockfish fillets (other than ocean perch) were 80,000 pounds on March 31, 1964, compared to 54,000 pounds the year before. No holdings were reported from the Chicago area.

We estimate that rockfish might account for approximately 6% of total marketable production of an Alaska bottomfishery; half in the form of #5 frozen fillets and half as IQF.

(c) Pacific Cod

The 1962 U. S. cod catch was 50,095,000 pounds. Of this total 46,910,000 pounds represented the Atlantic species, while only 3,185,000 pounds came from the Pacific. In 1963, the Atlantic

cod catch dropped to 42,000,000, and the Pacific cod catch more than doubled to 6,400,000 pounds (largest catch since 1959).

In spite of the fact that it is relatively unimportant in California and Oregon, Pacific cod has become the most important species in the British Columbia and Washington trawl fisheries. From 1956 to 1960, the catch off British Columbia averaged 16,250,000 pounds, 87% of the entire west coast catch (Figure 9).

Exploratory fishing surveys indicate that Pacific cod is the dominant roundfish on the inner shelf between the Strait of Juan de Fuca and Unimak Pass, and that catch per unit of effort is high from Puget Sound north to the Bering Sea (Section 2B(6)).

Cod is manufactured into a variety of items in the U. S. 1961's production was typical:

Fresh fillets	6,588,100 pounds
Frozen fillets	3,143,900 pounds
Breaded & Frozen cakes	1,583,000 pounds
Salted (whole, fillets)	1,137,500 pounds
Smoked (whole, fillets)	420,600 pounds
Lutefisk (dried cod)	1,176,600 pounds

In 1961, U. S. west coast production of fresh cod fillets was 673,100--almost all in Washington. Production of frozen cod fillets was 212,700 pounds and 5,800 pounds of salted cod were produced in Washington. Concurrently, Seattle receipts show imports of smoked and salted cod; in 1963, 664,000 pounds of smoked cod arrived at the Seattle wholesale market (mainly from Massachusetts and British Columbia), while 127,700 pounds of salted cod arrived from British Columbia and other countries.

Only tiny amounts of Pacific cod reach Chicago, despite large cod shipments from Massachusetts and eastern Canada. Of 1,003,200 pounds of frozen cod fillets received in Chicago in 1963, none was from the west coast; of 1,317,500 pounds received in 1962, only 3,200 pounds were from the west (British Columbia). Chicago receipts of frozen cod fillets have dropped continuously and sharply, plummetting over 60%, from 2,552,500 pounds to 1,003,200 since 1956. During that seven-year period, Pacific cod receipts (all from British Columbia) totalled 12,200 pounds.

The Defense Subsistence Supply Agency bought 687,400 pounds of frozen cod fillets in 1963. (It is not known whether any of this was Pacific cod).

U. S. holdings of cold-storage cod fillets totalled 6,011,000 pounds on June 30, 1964--1,668,000 pounds under the comparative level in 1963. Chicago holdings on July 23, 1964, presumably all Atlantic cod, were 242,800 pounds--77,000 pounds under the 1963 level. Washington-Oregon-Alaska holdings on March 31, 1964 were 252,000 pounds--180,000 pounds over the comparable 1963 level.

Pacific and Atlantic cod represent different species. Biggest competition for U. S. producers of frozen cod fillets on both coasts are Canada and Iceland, both of which export an excellent product that has wide acceptance. On the west coast and in the midwest, most in the industry (and some in the BCF) claimed that the Pacific species is inferior to Atlantic cod in consistency and general quality. Others stated that quality is equal; that the current low market opinion of Pacific cod is the result of mishandling. We were not in a position to judge which of the two schools of thought was correct. However, it is probable that Pacific cod will not be a major product of a large, modern Alaska bottomfish industry, at least for some time.

We estimate that Pacific cod might account for 3% of total marketable production of an Alaska bottomfishery; half in the form of #5 frozen fillets and half as IQF.

(d) Lingcod

Lingcod (actually a large greenling) is another exclusive-to-the-Pacific species. U. S. catch in 1960, 1961 and 1962 was respectively 7,926,000 pounds, 7,999,000 pounds and 6,284,000 pounds. The average 1956 to 1960 lingcod catch was 7,310,000 pounds, three-quarters of which was caught in waters contiguous to British Columbia, and most of which was landed in Washington.

1963 U. S. production of fresh lingcod fillets was 570,200 pounds--somewhat less than half of 1961's 1,200,800 pounds. 1963 U. S. frozen lingcod fillet production was 568,500 pounds, compared to 743,000 in 1961. There are no MNS records of lingcod receipts at the Chicago wholesale market since the 1940's. However, distributors in the midwest know of lingcod and sell limited quantities in both frozen fillet and IQF form. And we discovered that it is used by at least one important midwest processor for fish sticks. Despite current small sales, it is highly regarded in its frozen state, its critical area being price. Lingcod is also highly esteemed as a fresh fish; it is popular fresh (as steaks and fillets) along the Pacific coast. It keeps well in both fresh and frozen form. Some lingcod is smoked.

There are no reported Chicago area cold-storage holdings of lingcod; frozen lingcod fillet holdings in the Washington-Oregon-Alaska area were 4,000 pounds on March 31, 1964--1,000 pounds over the comparable 1963 date.

As noted in Chapter 2A(6), lingcod is found in commercially-exploitable quantities between Oregon and Cape Spencer.

We estimate that lingcod might account for 3% of total marketable production of an Alaska bottomfishery; half in the form of #5 frozen fillets and half as IQF.

(e) Pacific Pollock

Chapter 2B(6) points out that exploratory surveys indicate that Pacific pollock (Theragra chalcogrammus) is numerically the most important roundfish north of Juan de Fuca Strait; that it comprised 36%-54% of roundfish in the B.C.-Southeast Alaska region, 45%-56% in the Gulf region, 39%-66% in the Peninsula region and 82% in the Bering Sea.

This cod-related Pacific species is not yet marketed as a food fish, although it does find a market in British Columbia as mink food. Between 1956 and 1963, an average of 63,000 pounds of pollock were caught off British Columbia.

The Atlantic pollock (Pollachius virens) is a different species. It has no specialized "fishery" in New England; is landed incidentally by trawlers fishing for haddock or ocean perch. The species is fairly popular as a price item in the eastern fresh fish market, and is sold also as frozen fillets and in blocks for fish sticks. The Atlantic pollock has a good flavor and texture, although its somewhat darker meat makes it less popular than Atlantic cod.

The U. S. Atlantic pollock catch has been decreasing since the late 1930's. Landings in 1954 were 20,411,000 pounds. By 1962 this figure had dropped to 16,333,000 and in 1963 the catch decreased further to 14,600,000 pounds. During these latter two years, the Canadian Atlantic fishery landed 60,807,000 pounds and 56,585,000 pounds, respectively.

1963 U. S. production of fresh Atlantic pollock fillets was 1,507,400 pounds, while production of frozen Atlantic pollock fillets was 3,969,800 pounds. Relatively small amounts of Atlantic pollock are smoked.

Atlantic pollock is little known and little esteemed in west coast and southwest markets. Its receipts at the Chicago wholesale market are erratic: frozen pollock fillet receipts for 1959, 1960, 1961, 1962 and 1963 were respectively 542,700 pounds, 254,400 pounds, 121,600 pounds, 177,800 pounds and 93,900 pounds.

U. S. holdings of cold-storage frozen Atlantic pollock fillets were 714,000 pounds on March 31, 1964--140,000 pounds over the comparable 1963 figure. Chicago area holdings on July 23, 1964 were 19,200 pounds--7,900 pounds over the comparable 1963 figure.

We found much midwest interest in Atlantic pollock, particularly on the part of processors seeking assured supplies of pollock blocks for fish sticks. One processor reported that he processes 40,000 pollock blocks monthly for an established, growing market. Several processors expressed definite interest in blocks of Pacific pollock--assuming that quality and price could equal supplies from the east and that supplies could be assured.

Because of the wide availability of the resource in the northeastern Pacific, Pacific pollock might be able to satisfy the potential demand. Unfortunately, little is known about the qualities of the species for food fish use, for it is not presently exploited for that purpose. For this reason, we doubt that Pacific pollock will be a beginning component of marketable production of an Alaska bottomfishery. It might be in time, however, with adequate experimentation and market development.

(f) Pacific Hake

Pacific hake is another cod-like roundfish with wide distribution in the northeastern Pacific. It is found in all regions south of the Alaska Peninsula and at all depths through 399 fathoms. It is of major importance in the bottomfish community between Oregon and the Strait of Juan de Fuca.

Moderate quantities of Atlantic hake, particularly White hake (Urophycis tenuis) are landed by U. S. fishermen. The catch of this species was 5,728,000 pounds in 1962 and 6,200,000 pounds in 1963.

Unlike Atlantic hake, the Pacific variety seldom reaches market, and is not now commercially exploited. Some feel that its potential is small, because of its reportedly soft flesh and lack of flavor. Others, like F. E. Price, Dean of Agriculture at Oregon State University, contend that "Pacific hake is a little used species of fish that probably represents Oregon's largest latent fisheries resource. Because of its low oil content and excellent fillet yields, Pacific hake holds considerable promise as a commercially valuable food fish."23/

We doubt that Pacific hake will be a beginning component of marketable production of an Alaska bottomfishery.

(g) Dogfish

The Dogfish shark, once subject of a major commercial fishery on the west coast, is found in all regions south of the Peninsula, and is particularly abundant off Washington and British Columbia.

Dogfishes were originally exploited for industrial uses. Dogfish meal has a high nitrogen content. Dogfish livers have high vitamin A content. However, synthetic production of this vitamin resulted in a sharp curtailment of the fishery in 1948. An Alaska bottomfishery would probably not include this species in its initial production.

23/Hearings before the Merchant Marine and Fisheries Subcommittee of the U. S. Senate Committee on Commerce, April 25, 1963, p. 104.

(4) Blocks and Slabs

Most U. S. produced fish sticks and portions are produced from imported blocks and slabs of groundfish fillets (see Section 3B(2)); blocks and slabs which, in many cases, are produced in Canada by subsidiaries of U.S. processors. In 1963, 153,272,000 pounds of frozen blocks and slabs were imported into the U.S., 9,731,000 pounds over 1962. Imports from Canada both years were 75,747,000 pounds and 76,101,000 pounds, respectively.24/

Comparatively small amounts of slabs and blocks are produced in the U. S. An analysis of the yearly production of fish sticks and portions, and of block and slab imports, indicates that U. S. production of the latter amounted to at least 10,000,000 pounds and 20,000,000 pounds during each of the last two years.

Most blocks and slabs are made of filleted groundfishes--primarily cod and haddock, but as previously noted, also including some minor amounts of pollock. In addition, blocks and slabs of flounder and sole and Atlantic Ocean perch are produced.

We were unable to find any west coast production of blocks and slabs (those in the industry and with BCF reported that potential west coast producers cannot get costs sufficiently low). However, there is a producer of fish sticks and portions at Santa Rosa; and, of course, a number of fish stick and portion producers in the midwest.

An Alaska bottomfishery source of blocks and slabs might find markets among the large fish stick and portion processors in the west. Indeed, several such processors expressed interest in an assured supply from Alaska. However, the manufacture of blocks and slabs requires additional expensive machinery; moreover, it requires a technological and production expertise which will be almost impossible to develop in a short period of time. In addition, competition on a price basis with the present efficient (and to a large extent, captive) mass producers of blocks and slabs, will be extremely difficult for an Alaskan bottomfishery; and initial diversion of production energies from higher unit-price and cheaper-to-produce frozen fillets and IQF would seem unwise. (See Chapter 5E for comparative price details.)

For the above reasons, among others, we do not anticipate early block and slab production for an Alaskan bottomfishery, in spite of the continuing rapid growth of the fish stick and portion industries.

24/Daily Fisheries Products Report N-51, New York, MNS, BCF, March 13, 1964.

Note: Unless otherwise identified, the statistics used in Sub-section 3B, above, were obtained from the following BCF publications:

Fishery Statistics of the U. S. 1960 (Stat. Digest #53)
Fishery Statistics of the U. S. 1961 (Stat. Digest #54)
Fisheries of the United States 1962 (C.F.S. #3200)
Fisheries of the United States 1963 (C.F.S. #3500)
Annual Summaries 1956 through 1963, Receipts and Prices of Fresh and Frozen Fishery Products at Chicago, MNS, Chicago
Monthly Summaries 1963 and 1964-thru-May, Chicago's Wholesale Fishery Products Receipts, etc., MNS Chicago
Annual Summaries 1960 through 1963, Seattle Landings, Receipts and Value of Fishery Products, MNS Seattle
Chicago Salt-Water Fish Receipts Compiled for the Years 1941 to 1961, MNS Chicago
Packaged Fishery Products 1963 (C.F.S. #3455)
Imports & Exports of Fishery Products 1958-1962 (C.F.S. #3185)

3 E. PROJECTION OF LONG RANGE TRENDS

(1) Trend to More Convenience Items

We have noted in Chapter 3B(1) that the U. S. supply of frozen groundfish and ocean perch fillets and blocks increased almost 22%, to 315,057,000 pounds during the decade ending in 1963--a percentage that exceeds the U. S. population rise during the same period. Statistics 25/ reveal that per-capita consumption of groundfish and ocean perch fillets and blocks rose from 1.48 pounds to 1.65 pounds between 1954 and 1963. The increase is significant in view of the fact that overall per-capita consumption of commercially-caught fish and shellfish is barely holding its own. (See Figure 11.)

During the same period (see Chapter 3B(2)) production in the United States of frozen fish sticks and portions have maintained an extraordinary rate of growth: the former totalled 79,295,000 pounds in 1963 (30% more than the 1958 production), and the latter reached 94,647,000 pounds in 1963 (a five-year 334% rise). And as noted previously, other portion-controlled items have shown recent expansions--particularly IQF in the midwest and west.

The growth of such convenience items has been the leading factor for optimism in an industry which is far from healthy, and which is steadily and increasingly buffeted by competition from poultry and beef at lower and lower prices.

25/Fisheries of the United States 1963 (C.F.S. #3500), BCF.

The continuing urbanization of the U.S. will accelerate this fishery product trend to those packaged, easy-to-heat, easy-to-serve items modern housewives demand, and to those standardized portion-controlled items restaurants and institutions find most efficient to handle.

On the other hand, while fresh fish is unbeatable when it is at the peak of its freshness, this item will continue to decline, because the housewife is less and less inclined to handle the raw product in her kitchen, and because that product too often is at a low level of quality.

The fact that imports are increasingly important in convenience items is tangible evidence that further expansions of that sector will not necessarily benifit local processors. Chapter 3B(1) noted that imports of frozen fillets and blocks increased 94,000,000 pounds from 1954 to 1963 (and rose from 53% to 74% of total supply), while U.S. production dropped 39,100,000 pounds (and slid from 47% to 26% of total supply).

Foreign fisheries (notably the Canadian, European, Japanese and Soviet) are generally more modern than ours; foreign vessels are larger and more efficient; foreign wages are lower and foreign subsidies are often substantial. No wonder, then, that frozen foreign products dominate the interior U.S. markets, while local producers have been primarily relegated to decreasingly important fresh fish markets, near sources of supply.

If the U. S. fishing industry is to grow, it must become as competitive and efficient as its foreign competition. Production and processing will have to become increasingly vertical in structure. Vessels will have to be built larger, with more modern devices for handling and storing fish...and processing plants will have to be more fully automated.

Although imports have captured many markets formerly handled by the U. S. fishing industry during the past two decades, all is not lost. Recently, foreign costs have been rising much faster than ours; from 1957 through 1962, the unit labor cost in U. S. manufacturing rose approximately 3%, while for the same period it rose 4% in Canada, 14% in Japan, 17% in the U. K. and 26% in Germany.26/ And in Iceland, the New York Times reported27/, there is "a tidal wave of protest against the rising cost of living sweeping across (that) fishing nation. Icelanders, who won 15% wage increases last December, have indignantly watched most of their gains disappear as prices have continued upward."

In short, there is a chance that a modernized, more rational U. S. fishing industry in a relatively price-stable U. S. economy can become increasingly competitive; can win back much of its lost local market. The more it concentrates on the convenience items demanded in increasing numbers by the American market--packaged, frozen fillets; portion-controlled items, including IQF; blocks and fish sticks and other block-derived portions--the more successful it will be.

26/Newsweek Magazine, June 8, 1964.
27/May 17, 1964.

(2) Future Trends of Northeast Pacific Bottomfish

Chapter 3D discussed recent catch, processing and marketing trends of species represented in the northeastern Pacific bottomfish community. Here, we briefly summarize these trends and note their implications for the future.

Pacific flounder and sole: Both Atlantic and Pacific flatfish catches have been rising; the former more rapidly that the latter. Frozen flatfish fillet production has increased apace, as have Chicago receipts of frozen flatfish fillets (in the face of a sharp overall decline in Chicago salt water fish receipts). During the past four years Chicago receipts of frozen west coast flatfish have quadrupled. And, in the face of rising Washington State production of this manufactured form, Seattle still imports sizeable amounts. Cold-storage holdings are not excessive. There is general agreement on the part of the industry that there is also great potential for west coast flatfish IQF, if competitive. Prognosis for Pacific flounder and sole: continuing good growth probabilities.

Pacific Ocean perch: The disintegration of the Atlantic Ocean perch fishery presents the Pacific species with an unparalleled opportunity to fill part of the gap. From 1960 to 1962, Pacific Ocean perch landings doubled; from 1961 to 1963 U. S. production of frozen P.O.P. fillets grew even faster. In the face of sharp drops in Atlantic Ocean perch receipts at Chicago, receipts of frozen P.O.P. fillets have skyrocketed. Despite increasing frozen P.O.P. fillet production in Washington, Seattle receipts of Atlantic Ocean perch from Massachusetts continue to rise. After a long month-to-month rise in U. S. ocean perch cold-storage holdings, June 1964 was less than the comparable 1963 mark. Reports indicate increasing demand for P.O.P. IQF, limited amounts of which are now being marketed. Prognosis again favorable for sales increase in the immediate future, but continuing strong criticisms of quality and taste set definite limits to ultimate potential.

Sablefish: Chicago receipts of frozen sablefish are significant, but have been declining steadily. Chicago cold-storage holdings have backed up, probably the result in part of the recent Great Lakes botulism scare which has affected all smoked varieties. Little improvement of prospects in sight, for immediate future.

Other Rockfishes: Fresh and frozen rockfish fillet production rising, but an Alaska bottomfishery will find the former quite difficult to compete with. Few frozen rockfish fillets recorded as reaching the Chicago market. Prognosis: a limited market that will take long, hard work to develop; no spectacular growth foreseen.

Pacific cod: Only tiny amounts of frozen Pacific cod fillets reach the midwest, where frozen fillet receipts of Atlantic cod have been appreciable, but fast-declining. Present unfavorable impression of Pacific variety will require intensive market development to counteract. If this can be done, and if intrinsic quality of the fish permits, a modest market may be developed.

Lingcod: Frozen fillet production fluctuates with fluctuating catch, but species fairly well thought of and will have limited market in fillet, IQF and block forms, if price-competitive. Top reputation as fresh fish, but Alaska will find it difficult to compete in that condition.

Pacific pollock, an unknown quantity at present, might have potential as a low-price substitute for groundfish blocks and slabs. The same is true for Pacific hake, another unexploited species. Pacific turbot, present in the northeastern Pacific in great quantities, might have an industrial use possibility. Much experimentation will be needed for each of these three species before true potentials can be determined.

As noted previously, the safest initially exploitable forms for an Alaska bottomfishery would seem to be frozen fillets and IQF. Blocks and slabs represent additional sales possibilities for certain species, and would cost less to distribute (they would be purchased in large quantity by a relatively few big processors of fish sticks and portions), but their higher production cost and lower unit price make them dubious starters.

(3) Technological Breakthroughs

A look into the future cannot ignore new processing developments which are in the developmental or initial stages. These include dry-freeze and, importantly, irradiation. As for dry-freeze and its related "vac-pac"--these processes are too new, too costly and too limited in potential to consider for initial production of an Alaska bottomfishery. Irradiation, when perfected, will be a much more significant factor - it can conceivably revolutionize U. S. fish marketing; however, its development is regarded to be from 5 to 10 years off - beyond the range of our short-term look into the future.

We have concentrated our attention upon already-marketed species in well-known, well-accepted manufactured forms, such as frozen fillets and IQF, because a brand-new market force, if it is to develop large-scale sales volume rapidly, must capitalize upon existing demands. Reliance upon the more speculative species and manufactured forms might lead to insurmountable difficulties.

CHAPTER IV

FISHERY BY-PRODUCTS

This Section briefly discusses by-products, because fillets, the principal products of an Alaska bottomfishery, use only minor portions of the landed whole fish. Whether destined for use in #1's or #5's, as IQF, or as raw material components for large blocks and slabs, all-flesh fillets represent only fractions of the total weight of roundfish; the remaining portions--including head, bones, viscera, fins and tail--are either used for fishery by-products, or are thrown away as waste.

The fillet recovery ratio (percentage of fillet weight to total round weight) varies by species, group and processing considerations, such as whether the skin is left on. The recovery ratio for flounder and sole fillets varies between 25% and 30%; that for rockfish (including ocean perch) is much the same. For the groundfish group, recovery ratios equal 40% to 50%. In almost every instance, therefore, it can be seen that more of the roundfish weight is represented by "waste" than by recoverable flesh.

For the fish we are considering, the "waste", if not thrown away, can be used for industrial purposes. Some of this scrap by-product material (called "gurry") of the filleting plants is sold in an unprocessed state for use as mink feed. Most, however, is sold for reprocessing into fish meal, for use (domestically) in animal feed. (Minor amounts of fish meal are used in fertilizers.)

Industrial fish products are valuable as high sources of protein. They also contain other unidentified growth factors which, with the high protein content, make them valuable as supplements for poultry and pig feed.

The term "fish meal" refers to a product obtained from whole fish, as well as from fish gurry. In point of fact, most of the world supply of fish meal is made from the whole fish, rather than from the waste of filleted fish.

Depending upon the nature of the input, including importantly, whether or not the whole fish is used, fish meal in its finished form weighs from 15% to 20% of the raw material.

Other important industrial by-products include solubles, homogenized condensed fish, and fish oil.

4 A. SUPPLY AND PRODUCTION

Between 1954 and 1963, the U. S. supply of fish meal and solubles jumped from 462,066 tons to 693,857 tons. The 50% rise during the decade resulted entirely from increased imports. U. S. production of fish meal and solubles remained constant; it was 314,482 tons (68.1% of total) in 1954, and 307,153 tons (44.3% of total) in 1963.1/

The fish meal and scrap component of the above figures is more pertinent to this discussion, and the story there is much the same. The U. S. fish meal supply rose from 402,744 tons to 636,559 tons during the decade. U. S. production again remained fairly constant--totalling 256,967 tons in 1954 and 253,452 tons in 1963. Imports, however, more than doubled--rising from 145,777 tons (and 36.2% of total) in 1954 to 383,107 tons (and 60.2% of total) in 1963.

> The 10-year trend masks a dramatic 1963 decrease of U. S. fish meal production (19% under 1962's figure of 312,300), which resulted from a sizeable drop in the catch of menhaden, the species that usually accounts for approximately 75% of U. S. production.

Key exporters of fish meal to the U. S. in 1963 were Peru, which accounted for 291,544 tons (more than the entire U. S. production); Canada, which shipped in 50,925 tons; and Chile, which accounted for 24,294 tons.2/ There is no U. S. customs duty on fish meal and solubles.

Major sources of the 1963 U. S. fish meal and scrap production of 253,452 tons were menhaden (181,750 tons) on the east and Gulf coasts, and tuna (29,957 tons) on the west coast. An additional 25,240 tons on the east coast were made from "unclassified" fish including Atlantic Ocean perch. Pacific herring (primarily from Alaska) accounted for 2,659 tons of fish meal and scrap; this species is caught exclusively for the manufacture of fish meal and oil and bait.3/ Other west coast sources of meal and scrap were the Pacific sardine and salmon.

As noted above, most fish meal is manufactured primarily from whole fish, which are caught exclusively for that purpose. This is true for the mainstay of the U. S. fish meal industry--menhaden, as it is for the basis of the Peruvian fish meal industry--anchovetta.

In 1949, New England fishermen developed the so-called "trash" fish industry, and fished for species that were converted whole into meal. But that industry encountered marketing difficulties, and in 1959 the fishery was discontinued. Insofar as bottomfish are concerned, the present New England fish meal and scrap industry is used exclusively to dispose of unrecoverable waste.

1/Fisheries of the United States 1963 (C.F.S. #3500), BCF.
2/Fishery Products Report 0-71, April 13, 1964, New Orleans, MNS.
3/Industrial Fishery Products 1963 (C.F.S. #3454), BCF.

4 B. PRICES AND PROTEIN CONTENT

Disposal of the unrecoverable waste of an Alaska bottomfishery would take one of two forms: the sale of scrap for mink feed, or conversion on-the-spot into fish meal.

(1) Mink Feed

During 1963 the "going rate" for mink feed scraps hovered around 2¢ per pound. Filleters in Seattle and Astoria reported scrap sales to representatives of furbreeders' organizations (who visit the plants periodically to pick up the waste) for 2¢/lb. A recent MNS 4/ report noted that Prince Rupert processors sold 61,000 pounds of mink feed at 2¢/lb. during the week ending March 14, 1964. (During our survey at that city, Prince Rupert processors reported that Canadian breeders are short of mink feed.) And, during the past few months, Denmark and Sweden have begun importing New England and Canadian fillet waste to supply food for Scandinavian mink farmers. Prices f.o.b. Gloucester, Massachusetts are at just under 2¢/lb....permit delivery in Denmark at about 3-1/4¢/lb. when shipped in large lots.5/

Price and demand fluctuations were noted, however. New Bedford filleters reported that mink feed scrap prices were seasonal, varied during the last year between 0.6¢ and 1¢ per pound. An Astoria filleter stated that demand was slackening in Oregon.

Scraps for mink feed are usually ground, bagged in clear plastic and then frozen. They reportedly brought 12¢/lb. delivered, in that condition, in Michigan, Minnesota and Wisconsin.

(2) Fish Meal

Prices for fish meal are calculated in terms of protein content, which in turn depends on the raw material used. Whole fish can render a yield of 80%-85% protein, while fish gurry from waste scraps will yield a lesser amount, in the vicinity of 58%-68% protein. The protein yield for whole fish is greater because of the higher fish flesh content; the greater percentage of bone structure present in gurry accounts for the lower protein yield when the gurry is processed. Viscera also affects protein content: "a distinct preference is shown for Yellowtail flounder gurry (viscera attached) as against cod and haddock gurry (eviscerated at sea) due to the fact that viscera give the Yellowtail gurry a higher protein content".6/

4/MNS Fishery Products Report S-52, Seattle, March 16, 1964.
5/MNS Fishery Products Report B-114, Boston, June 11, 1964.
6/A Technical Study of the Scallop and Flounder Industry of New Bedford, Mass., prepared for ARA by New Bedford Institute of Technology, 1963.

Whenever possible, gurry is blended with whole fish to insure production of a more uniform product. When gurry cannot be so combined, straight gurry meal is blended after manufacture with a whole fish meal that has been stored for blending purposes.

Fish meal prices appear weekly in many of the Fishery Products Reports. Figure 18 shows quotation ranges for certain species and deliveries, from March 1, to July 14, 1964. Before May 1, domestic supply was characterized by MNS reporters as "practically exhausted". From May through July 14, it was defined as "light, with demand good and market steady or firm". During the entire 4-1/2 month period, the supply of imported meal was described in the last-quoted terms. Prices during the period were higher than for comparable 1963 months, due primarily to bad November and December 1963 landings of Peruvian and Chilean anchovettas, and to a $2-$4 rise per metric ton in freight rates on shipments of Peruvian meal to U. S. ports. The Peruvian and Chilean anchovetta fisheries improved markedly during the early months of 1964, helping to bring prices down somewhat.

4 C. PROBLEMS AND OPPORTUNITIES

Recent field trips by BCF personnel have produced conflicting evaluations of fish meal and its potential. After a February 1964 visit to northeastern mixed feed manufacturers, BCF nutritionists reported that "practically all feed-mill officials expressed very high regard for fish reduction products in poultry and swine nutrition. A definite preference for U.S.-produced fish meal was expressed by nearly every feed manufacturer visited, the reason usually given being greater uniformity of product. There seems to be a general agreement among industrial nutritionists that the most economical poultry and swine rations are those that are supplied with reasonably liberal amounts of fish meal."7/

A subsequent report by a BCF animal nutritionist who visited mixed feed manufacturers and experiment station workers in Texas several months afterward noted, however, that "the comment most frequently heard was that at the prices prevailing in April and May 1964, fish meal is in danger of being 'priced off the market'. For example, a nutritionist employed by a large firm states that fish meal is not included in his rations unless minimum levels (usually 1% to 3%) are specified, and the comment encountered with second greatest frequency is that the mixed feed industry cannot much longer tolerate the extreme variability in quality exhibited by some imported fish meals. In addition, according to a number of mixed feed producers, domestic fish meals are not invariably of top quality."8/

7/MNS Fishery Products Report B-71, Boston, April 10, 1964.
8/MNS Fishery Products Report B-119, Boston, June 18, 1964.

Figure 18.

RECENT FISH MEAL PRICES AND RANGES
(shown in cost per ton and cost per unit of protein)

Raw Material Species	City Price Quoted	Protein %	Price Per Ton	Price Per Unit Protein	Form in which Packaged	Delivery Terms
DOMESTIC						
Tuna	Seattle	60%	$114	($1.900)	Paper bag	FOB plant
Tuna and Mackerel	Los Angeles	60%	$120-123	($2.000-2.050)	Bulk	FOB L.A.
Tuna and Mackerel	Los Angeles	60%	$123-126	($2.050-2.100)	Paper bagged	FOB L.A.
Herring	Seattle	70%	$133*	($1.900)	Paper bag	FOB Vancouver
Ocean Perch	Boston	57%	$126-132	($2.211-2.281)	Burlap bagged	FOB Gloucester
Menhaden	Chicago	60%	$128-130	($2.133-2.167)	Burlap bagged	FOB East Coast and Gulf ports
Menhaden Scrap	Chicago	60%	$124-128	($2.067-2.133)	Burlap bagged	FOB East Coast and Gulf ports
IMPORTED (from Peru and Chile)						
Anchovetta	Chicago	65%	$125-134	($1.923-2.061)	Burlap bagged	FOB East Coast and Gulf ports
Anchovetta	Los Angeles	65%	$136-138	($2.092-2.123)	Paper bagged	Ex-Dock, West Coast ports

*U.S. funds. This meal from British Columbia. MNS noted on 3/31, "supplies sold out. Fishing season over."

SOURCE: MNS Fishery Products Reports - March 1 to July 14, 1964

One bright future prospect for an eventual increase in the demand for industrial fish products is the refinement of fish meal into a fish flour suitable for human consumption. The Food and Drug Administration maintains that fish flour cannot be sold for consumption in the U. S., because it is made from the whole fish, including head, fin, tail and viscera. Export of the flour for human consumption abroad is legal, but its acceptance in foreign countries is understandably lessened by its illegal status here.

Of interest to a potential Alaska bottomfishery are current fish flour experiments being conducted at the Fisheries Research Board of Canada's Halifax technological station. Scientists there have produced high quality flour from groundfish fillets, from herring and other fish offal, and from non-commercial "waste" fish, such as dogfish, skate and other types of fish normally discarded by fishermen.9/

9/Fisheries Council of Canada Bulletin, January 1964.

CHAPTER V

CONSIDERATIONS CONCERNING THE ECONOMIC FEASIBILITY OF AN ALASKA BOTTOMFISHERY

5 A. INTRODUCTION

For low-priced fish, such as those which would be the marketable food products of an Alaska bottomfishery, the cost of raw material is minor. Much more important are the expenses of processing and handling, storing, distributing, packaging and promoting. Transportation costs to "lower 48" markets do not seem to be a critical factor in spite of many opinions to the contrary.

Most of those contacted during the extensive field surveys undertaken for this market survey were skeptical of the feasibility of an Alaska bottomfishery. Included among the majority were fish processors and distributors, as well as state and Federal government commercial fishery personnel and fishery economists. Adverse comments centered around these points:

- West coast bottomfish processors (from Prince Rupert on the north to Astoria on the south) reported unanimously that their profit margins were tiny; that what profit they did make was the result of fresh fish sales, not frozen fish sales--on which, if they were fortunate, they broke even. Moreover, the west coast fresh market is supplied locally; is subject to such intensive competition and sharp price fluctuations that an Alaska-based industry could expect few west coast sales of fresh bottomfish.

- West coast processors find it difficult to compete with frozen imports because of low wages and foreign subsidies. In addition, midwest distributors generally reported that frozen fillets and IQF portions of Pacific bottomfish were over-priced in comparison to imported (and to U. S. east coast) products. Several contended that west coast bottomfisheries could be operated only in conjunction with an extant profitable fishery (such as salmon or halibut); but that even diversified "old timers" were steadily dropping out of business.

- Having noted the unhealthy state of the present west coast bottomfishery, most then mentioned that Alaska was even less well situated to compete in the "lower 48". A well-known fishery economist stated the problem as follows: "When all is said and done, Alaska has too many negatives; it has the worst climate, the highest wages and the most costly transportation of all potential U. S. bottomfish-producing areas. Why choose it as the anti-import standard-bearer?"

- Several in the industry noted that the large west coast processors are not expanding their bottomfish operations; that processors, who take a large part of the risk, have been experiencing difficult times; that commercial venture capital, usually available for good prospects, has been shunning northeastern Pacific bottomfishing, because of a doubt that cash return on investment would be sufficient.

  This general pessimistic attitude was subscribed to at a 1963 meeting among three BCF regional directors and BCF/Washington personnel in the midwest. The conference, called to assess informally the prospects of an Alaska bottomfishery, concluded that fresh fish would have to be avoided (because of cost difficulties and the fact that a successful Alaska fresh operation might drive out present west coast processors), and that it was dubious whether Alaska could compete with frozen imports on the midwest markets. (The fear that an Alaska bottomfishery might dump large amounts on the western market and thereby put the small-scale west coast bottomfishery out of business is a prevalent one.)

Those who were optimistic over the Alaska possibilities were in the minority; but they pointed out that Alaska was a better base for volume production than California, Washington or Oregon--where fish resources were much more limited; that Alaska fish were probably of higher quality (they feed in less polluted water on more ample stocks of crustacea); and that Alaska had an unduplicated chance to establish a modern, efficient bottomfishery, from the ground up.

We found that most of the adverse comments were based upon an imagined transposition of currently-operating west coast bottomfisheries--with their present inadquacies and problems--up to Alaska. Most of those interviewed seemed to have difficulty imagining what a large-scale, modern bottomfishery would be like. As noted previously, the present west coast bottomfishery is antiquated and small in scale. Less modern than even the out-of-date U. S. east coast fisheries, it is light-years away from modern foreign processors in technique and concept.

The fact that Alaska can start from zero, with a large-scale vertical modern industry, is a very definite advantage. Custom, tradition, small fishermen, small processors and small local markets have helped perpetuate the status quo along the west coast for many years. And in this age of swiftly developing automation in the world fishery, maintenance of the status quo has meant continuing further regression and ever-lessening ability to compete.

In large measure, the west coast bottomfishery is only a parttime, "in-addition-to" business engaged in by processors of salmon and halibut, to "fill out their line". No really large-scale processor concentrates on bottomfish alone. And because bottomfish are considered necessary nuisances, their processing and marketing tend to be handled on a make-shift basis at much less than peak efficiency.

In aggregate, the present west coast bottomfishery might be said to represent a good-sized business. In 1961, 233 U.S. otter trawlers operated from Puget Sound south to Santa Barbara (the southern limit of the fishery). They employed 1,015 fishermen, and landed 101, 359, 600 pounds of fish worth $5,333,900.1/

If an Alaska bottomfishery were a vertical, modern, mechanized operation, it would of necessity have a major effect upon the present west coast industry--notably in the frozen area. Theoretically, it could to an extent also be competitive to frozen imports in the midwest, at certain times, for certain species.

In this Chapter, we analyze a number of the factors which would help determine the inherent profitability potential of the concept: wages and processing considerations, shipping costs, marketing, distribution, merchandising and promotion considerations, pricing and management considerations.

Currently there are several highly successful new projects which are exploiting hitherto untapped Alaska fishery resources, notably King and Dungeness crab. These new ventures are boosting Alaskan payrolls for both fishermen and processors--helping the state recover from the March 1964 earthquake.

We believe that Alaska bottomfish may one day soon also be exploited in an economically profitable manner. Certainly the resource and the potential markets both exist.

Sub-section 5B, below, covers wages and processing considerations which affected our conclusions; 5C covers marketing, distribution and promotion; 5D discusses pricing considerations; and 5E discusses management considerations.

5 B. WAGE AND PROCESSING CONSIDERATIONS

(1) Fishermen's Wages

U.S. and Canadian otter trawl fishermen are usually compensated on the basis of shares (or percentages) of the value of the catch. The "share system" originated on the east coast during whaling days.

Alaska fishermen are active during the short but lucrative salmon and halibut seasons, averaging about $3,100 in wages during the 3-4 months involved.2/ All too often they remain unemployed during the remainder of the year, subsisting with the aid of unemployment checks. Numbers of energetic and/or lucky fishermen make more than the average--some averaging $5,000-$6,000 per year, and more.

1/Fishery Statistics of the United States 1961, FWS Statistical Digest #54.
2/Donald McKernan, Director of BCF, quoted in The Daily Alaska Empire, April 17, 1964.

Unlike the Alaska fisherman, the east coast U. S. fisherman works most of the year--earning much less per week than the Pacific salmon or halibut fisherman, but earning somewhat more annually. 1957 per-man earnings of Gloucester trawl fisherman averaged from $4,300 (in 150-199 ton trawlers) to $5,000 (in 125-149 ton trawlers) with Maine trawl fishermen earning slightly more.3/ Local estimates of the 1963 earnings of New Bedford trawl fishermen were in the $8,000-$9,000 range, but New Bedford is in the midst of a Yellowtail flounder boom.

Eastern bottomfishermen fish the year round, as the weather permits. This is not the case with the Alaska fisherman who finds it difficult to take bottomfishing seriously, when he can earn $200 to $300 per week during salmon and halibut seasons. The Alaska fisherman who might receive 3¢ to 4¢ per pound for Dover sole or Pacific Ocean perch knows he can get from 14¢ to 24.35¢ per pound for halibut, and 20¢ to 64¢ per pound for salmon.4/ Under present practice, also, the Alaskan (and British Columbian) bottomfisherman receives less for his catch than does the Seattle fisherman, to compensate for the added transportation cost needed to carry his catch to the "lower 48" market. The Seattle fisherman receives 6.5¢ and 5¢-5.5¢ for the same bottomfish for which the Alaska fisherman may get 4¢ and 3¢ (see 5D (2) for further discussion of this point).

Clearly, therefore, Alaska fishermen must be motivated if they are to work in the bottomfishery. This will have to be accomplished through the probability of more dollar earnings per week than they might earn elsewhere. This could be possible for an Alaska bottomfishery, because the profitability of individual vessels depends to a large extent on their ability to spend a large proportion of their out-time fishing. Puget Sound fishermen are far from the British Columbia grounds where they catch most of their fish...they lose several days sailing up to the grounds, and several days on the return voyage. By comparison, the Alaskan fisherman is much closer to productive grounds; his vessel would be able to spend a larger proportion of its out-time gathering fish, by having eliminated much fruitless travel time. In addition, an Alaska project that calls for larger, better equipped vessels than are currently used for bottomfishing on the west coast, will permit the fishermen to make larger, as well as more frequent, catches. The large size of the vessel would also permit it to fish in rougher weather than can present west coast otter trawlers. These factors all operate to increase dollar earnings per unit of effort.

(2) Processing Wages

Labor costs in Alaska are generally higher than those in Seattle, one of the highest labor-cost cities in the U. S. And labor costs in the U. S. as a whole are, of course, far higher than they are in Canada and in Europe, the chief sources of our frozen fish imports. One can anticipate then that fish processing labor costs in Alaska would be among the highest in the world.

3/The Groundfish Industries of New England and Canada, Lynch et al., Boston College, (FWS Circular 121), 1960, p. 172.
4/MNS Fishery Products Report S-149, Seattle, July 31, 1964.

The base salary (exclusive of benefits) for a cold storage worker in Ketchikan was reported to be $2.95 to $3.13 5/ per hour, while the salary of his counterpart in Seattle was reported to vary from $2.50 to $3.15 per hour, and that of a Prince Rupert worker was $2.43 to $2.50 (Canadian funds).

Although no bottomfish filleters now work in Alaska, because of Alaska's higher cost of living we must expect that filleters' salaries there will be higher than the $2.35 (for women) to $2.50 (for men) base in Seattle, which in turn is higher than the $2.20 base for filleters in New Bedford, which again is higher than the $1.85 (for women) to $2.07 (for men) base reported for filleters in British Columbia. New Bedford processors estimate filleting costs at 3¢ per pound.

Wage rates in British Columbia are the highest in Canada, just as west coast wage rates are generally the highest in the U. S. On the other hand, earnings in the Atlantic Provinces of Canada (the biggest source of frozen fillet, block and slab imports - see Figure 12) are the lowest in Canada. In 1957, Nova Scotia and New Brunswick earnings were 11%-18%, respectively, below the Dominion average, while those in Newfoundland were 5% under the average.6/

Just as the lower standards of living in Canadian Atlantic Provinces are an important factor behind their lower fishing and processing costs, compared to those in New England, so do the generally reduced wage costs in the "lower 48", in Canada and in Europe render competition all the more difficult for high-cost Alaska.

Inertia and lack of incentive on the west coast have frozen filleting along hand-processed lines that were standard many years ago. Whereas the European, the Canadian east coasters and even New Englanders use automatic skinning and filleting machines, such use is frowned upon and ignored by west coast processors. For the above reasons, it is obvious that, to be even faintly competitive, Alaska cannot simply carbon-copy the archaic practices of U. S. west coast producers. An Alaska bottomfishery would have to automate its processing to the fullest extent possible.

(3) Mechanized Processing

The Baader Nordischer Maschinebau of Lueback, Germay is the world's leading manufacturer of fish processing machines. In addition to widespread acceptance by Europeans, the Japanese and the Soviet Union, close to 300 Baader #47 skinning machines are operating along the U. S. east coast and Canada, where they are used to skin roundfish and flatfish fillets up to a width of eight inches. We noted Baader #47 skinners in use at processors in New Bedford and Boston. The machine is fed by one man and skins fillets at the rate

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5/Wage Survey for the Ketchikan Labor Market, August 1963, Alaska Department of Labor, Division of Employment Security.
6/The Groundfish Industries of N.E. and Canada, p. 13.

of about 800 pounds per hour (40 to 60 fillets per minute).7/ There are no Baader skinning machines in operation on the U. S. west coast. Cost of the unit is $5,720 landed, ex-dock at New York, duty paid.

Baader has also perfected a number of roundfish filleting machines, among which are three for filleting cod and haddock (used in Boston), and importantly, two models (#157 and #150) for ocean perch. These latter two cost $25,860 and $35,200 respectively. There are at least 5 Baader #157 ocean perch filleting machines in use at Gloucester; another 5 in Maine. No Baader roundfish filleting machines are found on the U. S. west coast, where processors scoff at their practicality, stating that no machine can approach a hand filleter for accuracy and efficiency. Baader advertised that the #157 produces up to 9,600 fillets per hour, with two operators.8/

If properly adjusted, the Baader #157 would presumably be able to fillet Pacific Ocean perch (20%-25% of estimated marketable production of an Alaska bottomfishery) as well as it fillets the Atlantic variety. As of August 1964, however, Baader had not perfected a flatfish filleter. Until it does so, one cannot count on automatic filleting of Dover, English and Petrale sole which (see 3D(1)) are expected to account for approximately 60% to 65% of estimated marketable production.

> Baader hopes to perfect a flatfish filleter by 1965. In 1963 Baader placed a demonstration flatfish filleting machine (Model #170) at the Aiello Brothers, Inc. plant in New Bedford. The machine filleted properly after the fish had been beheaded, but had to be withdrawn when the heading element refused to operate properly. John Aiello reported that the machine will fillet 28 flatfish per minute, compared to 3-4 by hand, and with a better recovery percentage; he and other leading New Bedford processors expect the machine to be perfected in the near future and predict universal east coast acceptance within five years. Mr. Aiello states that its use will drop the price of filleted flatfish by 2¢ per pound; it will presumably also eliminate most, if not all, of the 400 filleters currently working in New Bedford.

Another mechanized processing device of importance to an Alaska-type bottomfishery is a recently developed Danish automatic fillet sorting machine. It speeds up the entire IQF process considerably by eliminating the present production bottleneck--slow hand sorting and weighing, for graded sizes.

7/Ibid, p. 136.

8/Even if a labor-saving automatic filleter were less efficient than hand filleters, and there is evidence to the contrary, it would still prove much more economical if it handled large, continuing quantities.

5 C. MARKETING, DISTRIBUTION AND PROMOTION

(1) Transportation and Transportation Costs

Published transportation rates from various possible Alaska bottomfishery sites to the midwest, west coast and southwest are not indicative of the true costs such an enterprise would obtain for large, continuous shipments south. Until now, backhaul to the "lower 48" from Alaska has been negligible; the printed rates in the various forwarder and carrier tariffs reflect either small, sporadic shipments or as-yet unused theoretical charges.

The key to low transportation cost is huge quantity (in full carload or truckload lots) at a single time, or in shipments so spaced that the transporter can move them with utmost efficiency. Tentative discussions with transportation companies and transportation specialists have convinced us that large carload shipments of frozen fish can be shipped to most points in the "lower 48" at a reasonable cost...and that transportation costs will not be a major determinant of the feasibility of Alaskan enterprise. This is especially true because the scarcity of backhaul freight from Alaska provides added transporter incentive for attracting bulk southbound or eastbound shipments.

Typical cost figures for recent actual or future anticipated shipments from Alaskan points to "lower 48" destinations are cited below. We stress that these figures are based on small, comparatively unimportant quantities; they therefore reflect the theoretical "paper" rates more than they do the significantly lower prices that can undoubtedly be obtained for large amounts, in firm-to-firm negotiation sessions. At that, it will be noted that costs by surface transportation are generally lower than may have been expected.

Railroad

Costs of July and August 1963 carload shipments between Saxman Terminal at Ketchikan and "lower 48" points (Routing: via rail barge to Prince Rupert, thence over Canadian National Railroad to southern points): 9/

- 67,600 pounds of frozen fish from Saxman to Chicago: 2.1¢ per pound.
- 60,000-pound and 82,800-pound shipments of frozen fish from Saxman to Cincinnati: 2.4¢-2.6¢ per pound.

9/Unpublished data, BCF, Washington, D. C.

- 73,500 pounds of frozen fish from Saxman to Louisville, Kentucky: 2.3¢ per pound.

- 61,900 pounds of frozen fish from Saxman to Miami, Florida: 3.4¢ per pound.

Cost to large frozen fish distributor via CNR is 1.67¢ per pound from Prince Rupert to Chicago; cost from Prince Rupert to New York City by same means is 2.26¢ per pound.

Truck

The BCF Transportation Section reported that truck rate for frozen fish from Valdez to Chicago was 65¢ per truck mile. For a 30,000 pound shipment the cost would equal approximately 8.7¢ per pound. The Chicago MNS provided similar figures: 8.5¢ per pound from Kenai to Chicago, and 6.5¢ per pound from Kenai to Minneapolis.

Carriers and forwarders reported the following Ketchikan-west coast rates, for truckload shipments of frozen fish (Routing: via Alaska Ferry to Prince Rupert, thence south by highway):

- Ketchikan to Seattle: approximately 1.7¢ per pound.
- Ketchikan to San Francisco: approximately 2.9¢ per pound.
- Ketchikan to Los Angeles: approximately 2.95¢ per pound.
- Ketchikan to Denver: approximately 3.45¢ per pound.
- Ketchikan to Phoenix and Reno: approximately 3.5¢-3.7¢ per pound.

(Truckload shipments from Seattle east to Chicago are approximately 2.25¢ per pound, while those from Gloucester west to Chicago are approximately 1.5¢ per pound.)

Air Freight

Pan American and Pacific Northern quote 1,000 pound fresh or frozen fish rates as follows:

- Annette to Chicago: 17.8¢ per pound.
- Ketchikan to Chicago: 19.8¢ per pound.
- Juneau to Chicago: 18.8¢ per pound.
- Ketchikan to Saint Louis: 27.45¢ per pound.

Fresh fish air shipments from Portland, Oregon to Chicago are 12¢-14¢ per pound; from Portland to Kansas City and Saint Louis they are approximately 13¢-14¢ per pound. (Air freight from Seattle to Los Angeles is approximately 8¢ per pound; Arctic trout from Dillingham is flown fresh to Chicago.)

Ship

The Alaska Steamship Company, with its huge backhaul availability, could prove to be a low cost transporter of large quantity shipments of frozen fish from an Alaska bottomfishery located at one of a number of ports. There are indications that the Company would willingly enter into negotiations; it now makes special voyages to almost any point in Alaska for large (approximately 500 ton) pickups, and is known to be quite interested in bulk fish backhauls.

The New Alaska Trainship Corporation's planned Whittier-New Westminster, B.C. freight route might also prove to be a comparatively inexpensive means of shipping a Westward Alaska bottomfishery's production to the midwest via various U. S. railroads.

(2) Distribution and Distributive Channels

A key to the successful marketing of Alaska bottomfish in quantity is the maintenance of steady, high quality. Because of its low unit value, bottomfish is too often mishandled by fishermen who hold it in little regard. Too often those who process and handle bottomfish are inadequately equipped to do a proper job.

In Chapter 3D we pointed out that many Chicago distributors complain about the strong taste and inferior quality of certain Pacific species marketed there, and we noted that the objections seemed more the result of mishandling than of the intrinsic characteristics of the fish themselves. The fact that Alaska bottomfishery vessels would operate closer to the fishing grounds and the processing plant would mean an initial improvement in quality. But this improvement would have to be closely safeguarded throughout the entire distributive process to be effective.

Alaska bottomfish, if they are to penetrate an extant market to any significant degree, must be of a quality that is equal to that which now holds acceptance. For frozen fillets, at least, this means quality must be as good as the generally excellent present products of Canada and Iceland.

Another prerequisite to successful market penetration is assured supply. Distributors must be guaranteed regular, consistent supplies before they can consider abandoning present, long-established suppliers to take on the new product. Many fish brokers and distributors have been in business for over 50 years and have built up relationships over the years which will be difficult to change. They are generally sharp, sophisticated traders who insist on trading with professionalism in fulfilling commitments concerning quantities, qualities and dates. To gain their acceptance and support in the highly competitive processed fish market, an Alaska bottomfishery's distributive operation will have to be highly professional.

The exact mix of products to be marketed will depend upon individual sales and profit potentials. Our survey indicates that the major initial forms would consist of frozen fillets and IQF portions (Chapter 3B). With the species mix indicated, market penetration would follow definable lines.

An Alaskan bottomfishery would probably first employ the services of an aggressive, alert, "interested" local broker to represent the company on a commission basis. This broker would sell Alaska products to distributors who are either primary or secondary receivers (depending whether the broker had taken possession of the product).

A distributor sells his products directly to retail outlets (supermarkets or restaurants), institutions, and/or to jobbers, who take possession of the merchandise and sell in turn to small retailers or institutions. Much of this third-level distribution is handled via a route sales truck; terms are usually cash.

Sales to larger buyers, such as supermarket and restaurant chains, are made by the broker. In this case, the primary receiver would be the purchaser, and prices would probably be quoted f.o.b. Alaska.

It is conceivable that an Alaska bottomfishery might find it advantageous to make a working arrangement with Fishermen's Federation, Inc. (FFI) for initial penetration of the midwest market. FFI, the marketing arm of the Halibut Producers Cooperative and the Prince Rupert Fishermen's Cooperative Association, maintains a broker-distributor structure which now markets the somewhat limited bottomfish shipments of its members, in addition to its regular halibut business.

(3) Merchandising, Packaging and Promotion

In addition to establishing efficient distribution channels for high quality Alaska products, an Alaska bottomfishery would have to follow through with professional merchandising and promotional assistance.

The bottomfishery might develop an "Alaska package" for retail distribution to dramatize the cold, clean Alaska waters, and the fine-quality fish found there. It might also engage in private label packing for a chain. Potential fillet and IQF customers would have to be offered a rounded line; they require sufficient product variety to be able to offer customers a choice.10/

10/An Alaska processor will find packaging unusually costly; all supplies must be shipped up, including boxes, labels, cartons, glue, wire sealers, etc. Cartons have been known to cost more to transport than they do to buy.

Business Week recently pointed out 11/ that "when fish processors brought out frozen fish sticks in 1953, they jumped into the jungle of the supermarket"; that today processors are merchandising more and more like the soap business.

The professional merchandising and promotion program to be undertaken by an Alaska bottomfishery would include:

- A promotional fund, and a detailed action program outlining how it is to be disbursed.
- Product price lists.
- Possibly a cooperative advertising allowance.
- Point-of-purchase display material.
- An educational program for distributors, chefs and retailers (including free samples, taste tests, etc.)
- Adequate stock coverage quantities, protection against sudden price changes, and damaged goods coverage.
- Detailed follow-up calls.

In entering the midwest, west coast or southwest markets, an Alaska bottomfishery comes to "the big leagues". It will be competing against experienced foreign and domestic processors, some of whom feature comprehensive advertising campaigns.

The extent of foreign promotion in the U. S. is often overlooked. The following quotes from recent Hampton MNS Fishery Products Reports 12/ show the professionalism with which Denmark approaches the subject:

> "A Danish Fish Week at the New York World's Fair this year is in the planning stage...Marketing of Danish fish in the U. S. will be aided by a contribution from the Danish Ministry of Fisheries, which has decided to contribute to the Fish 'n Seafood promotion of the U. S. fishery organizations...The Danish Fishery Exporters Association has begun a market promotion program, primarily for exports, to be financed by its members and others who would benefit from increased trade...Slogans will be developed for use in three languages. Quality will be stressed ...To help cultivate the U. S. market, the Danish Government will refill the fisheries attache post in New York City."

11/February 15, 1964.
12/H-58, March 24, 1964 and H-74, April 15, 1964.

5 D. PRICING CONSIDERATIONS

(1) The Price Must Be Competitive

We have just discussed the importance of top quality, assured supply and professional distribution, merchandising and promotion, in the marketing of Alaska bottomfish. Perhaps the single most obvious prerequisite is competitive pricing. Representing a new, unknown line, frozen Alaska bottomfishery products will have to meet prices prevailing in the marketplaces. Moreover, at the beginning, reduced introductory prices may also be necessary to help induce distributors to begin carrying the products.

We cannot overemphasize the importance of competitive pricing. Competition in processed fish products is keen; processor price lists are important as starting bench marks; they are, however, usually only starting points for intensive price bargaining on the part of seafood buyers and brokers. An Alaska bottomfishery must have a reasonable price list; yet one with sufficient margin to enable it to bend in the give-and-take atmosphere which characterizes negotiations.

Seafood marketing history is studded with disasters that mark attempts by processors to enter markets at premium prices--even if the products are of premium quality. A recent notable example is the Gulf scallop failure: Two years ago exploratory fishing surveys showed large Gulf of Mexico scallop resources. Many fishermen and processors jumped aboard the bandwagon, and the new industry began to produce and market its admittedly better-than-sea scallop product, based on a bay scallop price...approximately double sea scallop...and cost structure. At the higher price, market penetration was found to be impossible, and the boom collapsed, dragging many into bankruptcy.

Chapter 3 showed that there are markets for Alaska bottomfish. The key question is whether Alaska products can be both price competitive and profitable (profitability is discussed in Sub-section 5E, which follows). It will be recalled that chief competition for Alaska's frozen fish products are the modern, mass production, low cost bottomfisheries of eastern Canada and Europe.

In the face of this competition, all possible cost factors will have to be watched carefully in the need to bring products to the market at prices which will both sell and provide a profit return. There are many areas in addition to fishing, processing and distribution where inefficient planning or carry-through can further reduce profit margins. These include improper or over-costly packaging and storage charges. Because of "business secrecy" and an apparently highly-negotiable rate structure, verifiable figures covering cold-storage costs were not obtained. However, the first-month charge for already frozen fillets placed in cold-storage seems to be about 35¢ per 100 pounds, and the charge per month afterward approximates 20¢ per 100 pounds. It can thus be seen that overshipments can force costs up significantly in a relatively short time.

In the final analysis, the frozen fillet and portion business is a low-class, low-end, overwhelmingly price-oriented field with little room for error in any phase of operation.

(2) Landed Prices and Seasonality Factors

Differing pricing structures on the U. S. east and west coasts introduce the element of seasonality into the marketing picture; because of these differences, the west coast becomes more competitive for various species during certain times of the year in Chicago and other midwestern centers. The opportunities and drawbacks introduced by seasonal price fluctuations are complicated by differences in Canadian price structures.

Landed prices for U. S. west coast bottomfish are established by agreement between fishermen's union and processor representatives. Contract prices are effective for a one-year period, but they are reviewed semi-annually for inequities. Figure 19 lists extracts of the 1964 Seattle Price Schedule negotiated in March of that year.

Figure 19. EXTRACTS FROM THE SEATTLE 1964 CONTRACT PRICE LIST, showing prices per pound to be paid to bottomfishermen landing their catches at Seattle.

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Soles:	Dover - 14 inches and over	6.5¢
	English - 11-1/2 inches and over	8.0¢
	Petrale - 3/31-9/30 (to 10,000 lbs.)	11.0¢
	(over 10,000 lbs.)	9.0¢
Pacific Ocean perch -	10/1-3/31	5.5¢
	3/31-9/30	5.0¢
	10/1-12/31	5.25¢
(Other) Rockfish - same as Pacific Ocean perch		
Sablefish -	large, dressed, 5 lbs. and up	14.0¢
	large, round, 9 lbs. and up	8.0¢
	small, dressed, 3-5 lbs.	9.0¢
	small, round, legal size	5.0¢
Pacific cod -	round	5.5¢
	dressed	12.0¢
Lingcod -	round	5.5¢
	dressed	14.0¢
Mink feed		2.5¢

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A comparison of the 1964 prices with those of previous years reveals that west coast levels have been static since 1957. For example: the contract price for English sole has been an immovable 8¢ per pound since 1957 except for 1958, when the price dropped 1/2¢; Pacific Ocean perch was 4.5¢ in 1957, 5¢ per pound from 1958 through 1962, and has been set between 5¢ and 5.5¢ since then; (other) rockfishes were 5¢ per pound from 1957 through 1963; presently, prices vary from 5¢ to 5.5¢, depending upon the time of year, etc.

British Columbia bottomfish landed in October-December 1963 were purchased at somewhat different prices. An analysis of these landed prices by B. C. port reveals the following per-pound prices paid (for comparative purposes, we note the Seattle landed prices in parentheses where sufficiently identified).13/

Rockfishes, at Vancouver - 4¢-8¢ (5.5¢)
Sole, at Vancouver - 5¢-9¢
Sole, at Prince Rupert - 4.75¢-6¢
Sablefish, large, dressed, at Vancouver - 18¢-20¢ (14¢)
Pacific cod, round, at Vancouver - 7¢ (5.5¢)
Pacific cod, round, at Prince Rupert - 3.5¢ (5.5¢)
Lingcod, dressed (?), at Vancouver - 12¢-16¢ (14¢)
Mink feed, at Vancouver - 2.25¢-3¢ (2.5¢)

It will be noted that Prince Rupert prices to fishermen are lower than they are at Vancouver. These price differentials, which help compensate for the added transportation costs required to bring the fish to market from the more remote areas, have their counterpart in Alaska ports for the landing of halibut.

Note how 1964 ex-vessel prices for Chix halibut at leading Pacific ports generally decrease as transportation distance to Seattle increases:

Juneau	12¢	Ketchikan	12¢-15.75¢
Pelikan	12¢	Prince Rupert	20¢-22¢
Petersburg	13¢-14¢	Vancouver	18¢-22¢
Wrangell	12¢	Seattle	20¢-26.5¢

This transportation equalization practice applies to the projected Alaska bottomfishery, for transport costs from anywhere in Alaska to the midwest, west coast and southwest will be more costly than they will from Seattle and other "lower 48" west coast ports, which are so much closer to markets.

13/Source: Weekly British Columbia Fish Marketing Report sections of Seattle MNS Fishery Products Reports, Oct. - Dec. 1963.

Fishing industry and BCF personnel with whom we discussed this matter doubted that an Alaska bottomfishery could afford to pay fishermen more than 65% of the landed Seattle price for bottomfish. In the case of Ocean perch this would mean an Alaska price of approximately 3.4¢; for Dover sole it would mean 4.22¢. Still, Alaska fishermen using larger, more efficient vessels, fishing closer to the resource, and in relatively untapped grounds, could conceivably earn more than their southern counterparts, though they are paid less per pound.

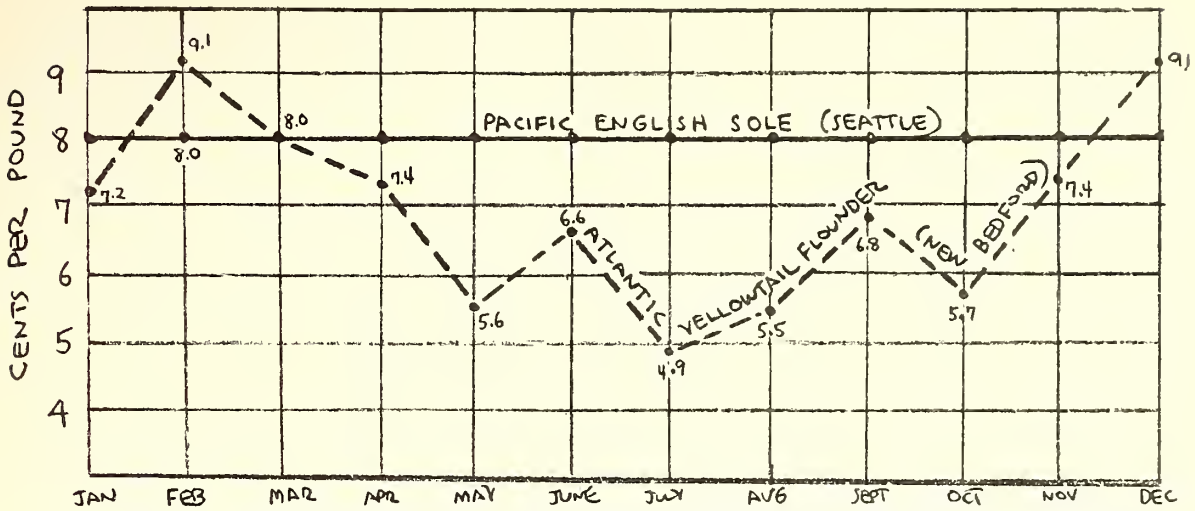
Unlike the stable U. S. west coast situation, the pricing procedure prevalent in the major New England bottomfish ports is a fluctuating one that is responsive to the shifting forces of supply and demand. There are daily auction systems at Boston, Gloucester, New Bedford, Portland and other ports where processors and fish dealers bid for catches contained in the holds of vessels in port. During periods of short supply, prices become especially volatile.

Figure 20 shows the monthly prices during 1963 for two roughly comparable (but far from identical) flatfish species: (Pacific) English sole and (Atlantic) Yellowtail flounder. The ex-vessel price for the former at Seattle was an inflexible 8¢ per pound each month during the year. The New Bedford ex-vessel price for the latter varied from February and December highs of 9.1¢ per pound to a July low of 4.9¢ per pound. It will be noted that the Atlantic species had a lower ex-vessel price during 9 months of 1963 and that the Pacific species was lower during 2 months. If we consider both species to be absolutely comparable (and they are not, for their tastes and other characteristics are quite different), it could be said that during December and February the English sole had a competitive price advantage over its Atlantic relative.

Figure 21 shows monthly landings for both species at Seattle and New Bedford respectively. The English sole landing pattern varies much more than that for Yellowtail flounder (possibly because of the comparatively small landings of the former). While there was, of course, no relation between landings and the fixed English sole price, there was a rough inverse correlation between monthly Yellowtail flounder landings and ex-vessel prices. Of interest from the point of view of possible competition between the two species, is the fact that peak English sole landings took place in December when Yellowtail flounder landings were less and the fish priced higher than the sole.

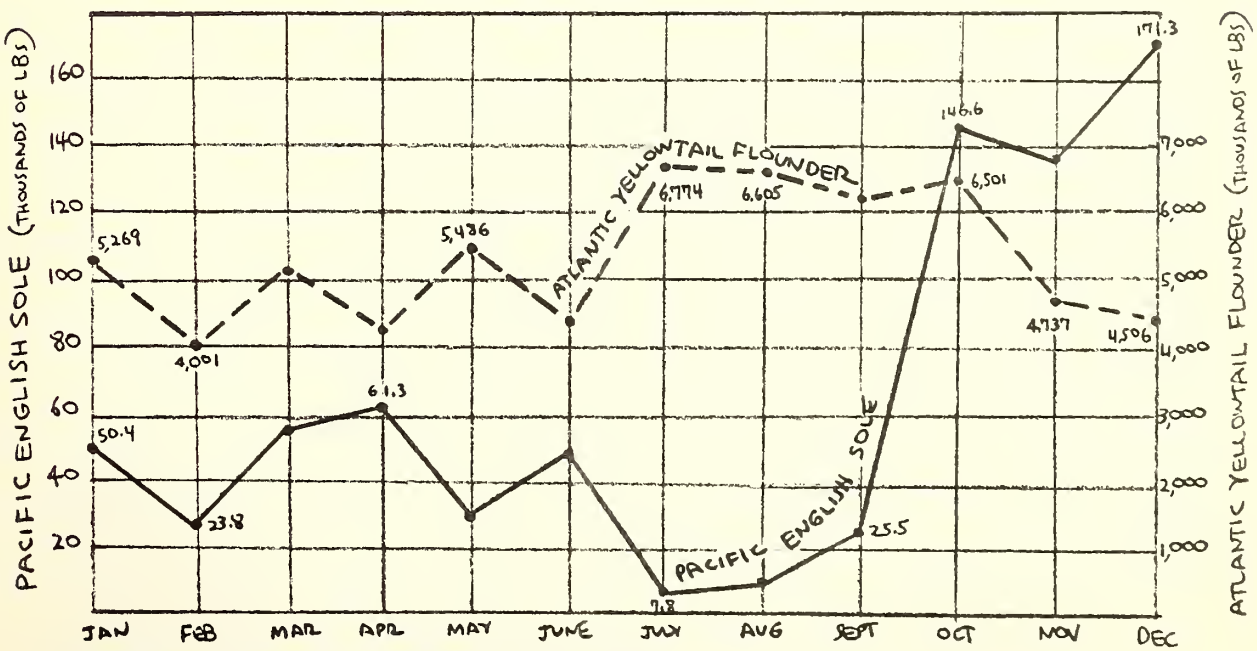
Similar comparisons will be noted in Figures 22 and 23. Figure 22 shows monthly 1963 ex-vessel prices for Pacific Ocean perch and Atlantic Ocean perch. The former varied, according to contract, from 5¢ to 5.5¢ per pound, landed at Seattle. The latter, landed at Gloucester, fluctuated between 4.7¢ per pound in July and August, and 5.68¢ per pound in November. The Atlantic species was lower priced during 7 months during the year, while the Pacific species held the price advantage during 4 months (April, and October-through-December).

FIGURE 20 - MONTHLY 1963 EX-VESSEL PRICES FOR (PACIFIC) ENGLISH SOLE LANDED AT SEATTLE, AND (ATLANTIC) YELLOWTAIL FLOUNDER LANDED AT NEW BEDFORD, MASS.



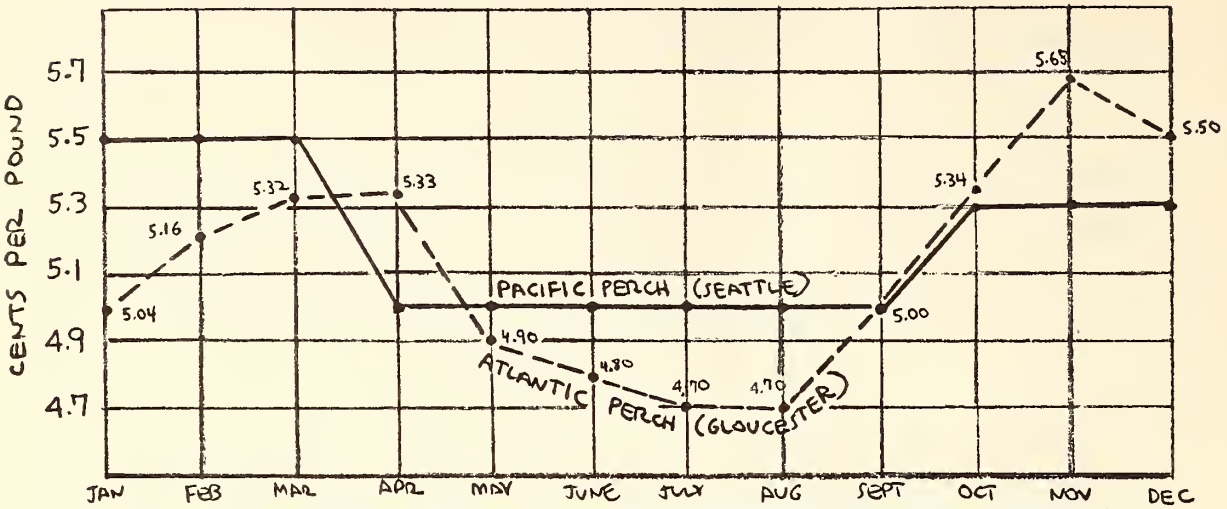
Sources: 1963 MNS Annual Summary of Seattle Landings, Receipts and Value of Fishery Products; and 1963 MNS Annual Summary of New England Fisheries (Boston).

FIGURE 21 - MONTHLY 1963 EX-VESSEL LANDINGS OF (PACIFIC) ENGLISH SOLE AT SEATTLE, AND (ATLANTIC) YELLOWTAIL FLOUNDER AT NEW BEDFORD, MASS.



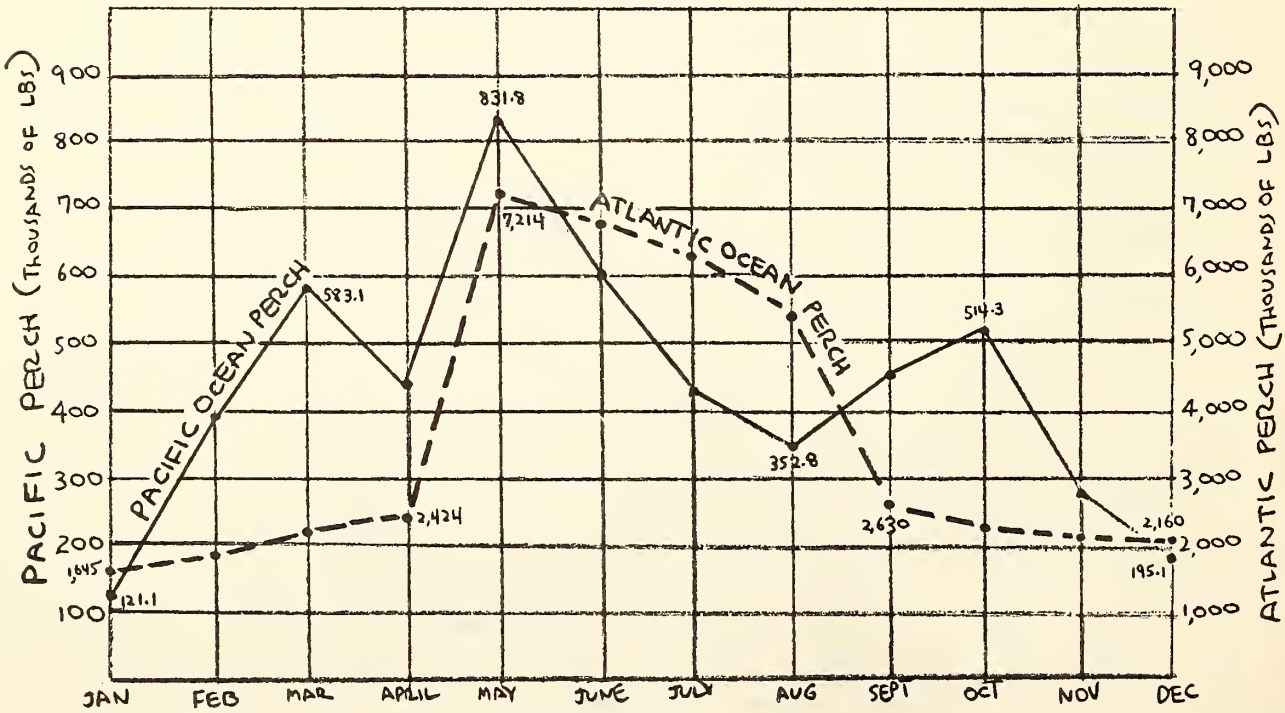
Sources: same as Figure 20, above.

FIGURE 22 - MONTHLY 1963 EX-VESSEL PRICES FOR PACIFIC OCEAN PERCH LANDED AT SEATTLE, AND ATLANTIC OCEAN PERCH LANDED AT GLOUCESTER, MASS.



Sources: 1963 MNS Annual Summary of Seattle Landings, Receipts and Value of Fishery Products, and 1963 MNS Annual Summary of New England Fisheries (Boston).

FIGURE 23 - MONTHLY 1963 EX-VESSEL LANDINGS OF PACIFIC OCEAN PERCH AT SEATTLE, AND ATLANTIC OCEAN PERCH AT GLOUCESTER, MASS.



Sources: same as Figure 22, above.

Landing patterns (see Figure 23) for the two ocean perch species were roughly similar, although here again the Atlantic fish was landed in much greater numbers. This time, however, the Pacific variety held the price advantage during small-landing periods.

Seasonal price advantage such as the above would be more significant if we were dealing with a fresh product which had to be marketed within a very short time. However, the price comparisons which are important to an Alaska bottomfishery are those for frozen, processed fish--something entirely different. For frozen fish, the marketing time element, while still important, is not critical to the point of days, or even a month or two, although deterioration does take place even in cold-storage. The fact that freezings can be made during periods of high catch and low price and held until periods of low catch and/or higher price, provides a flexibility not inherent in fresh fish marketing (see 5D(3) below for further discussion of this subject).

(3) Prices for the Frozen Products

Various processing operations reduce the recoverable (or saleable) portion of landed fish. Depending on the species and the end product desired, fish are filleted, skinned, drawn (eviscerated), or dressed (eviscerated and head removed).

Recovery ratios (percentage of processed, saleable weight to total round weight landed), as we noted in Chapter 4, vary from species to species. The recovery ratio for flounder and sole fillets and rockfish fillets (including ocean perch) varies between 25% and 30%; the groundfish group (cod, haddock, pollock, hake and cusk) have recovery ratios in the 40% to 50% range, etc.

Recovery ratios are approximations. Neither the industry nor BCF have developed standard figures because of differing efficiencies among filleters and processors, and because landing statistics are often (purposely) somewhat less than accurate.14/ However, the landed price and the recovery ratio are the two initial components which determine the selling price structure for processed fish.

14/The origin of these inaccuracies lies in the intensively competitive nature of the industry and its formal price structures. Thus, with the contract price for Seattle-landed English sole a fixed 8¢ per pound in periods of over-supply, a fisherman, to dispose of his perishable catch, will sometimes actually deliver more than the fictitious, stated poundage. By delivering to the buyer 11,000 pounds, rather than a publicly acknowledged 10,000 pounds for an agreed-upon $800, the seller receives only 7.27¢ per pound, but makes the sale. This interesting custom is prevalent on both coasts.

For example: 1,000 pounds of Dover sole landed in Seattle cost the processor 6.5¢ per pound, or a total of $65 (see Figure 19). Dover sole's recovery ratio is approximately 27% for fillets (skinless). Thus the processor obtains 270 pounds of Dover sole fillets for his original $65 outlay, and his net cost for the fillets becomes 24.1¢ per pound.

In addition to the weight loss which occurs during processing, the processor must also figure on an approximate 6% shrinkage which takes place between the boat weight-out and the dressing table.

The processor adds a markup, which includes his profit. He usually sells the frozen product to primary receivers (including dealers and brokers) f.o.b. his plant. The selling price continues to rise as the product is sold by original to secondary receivers, and eventually to the supermarkets, restaurants and institutions; each distributor adds an amount to reimburse him for transportation, cold-storage, promotion and other costs, plus a profit in return for services.

Figures 24 and 25 analyze price variations for frozen ocean perch fillets, and for frozen flounder and sole fillets on the Chicago wholesale market for 1962, 1963 and the opening months of 1964. The prices shown are the mean averages for the individual month variations; wholesale prices within a particular month usually vary by 2¢-3¢ per pound, although they are sometimes perfectly steady, and sometimes vary by as much as 5¢--depending upon quality and supply and demand factors.

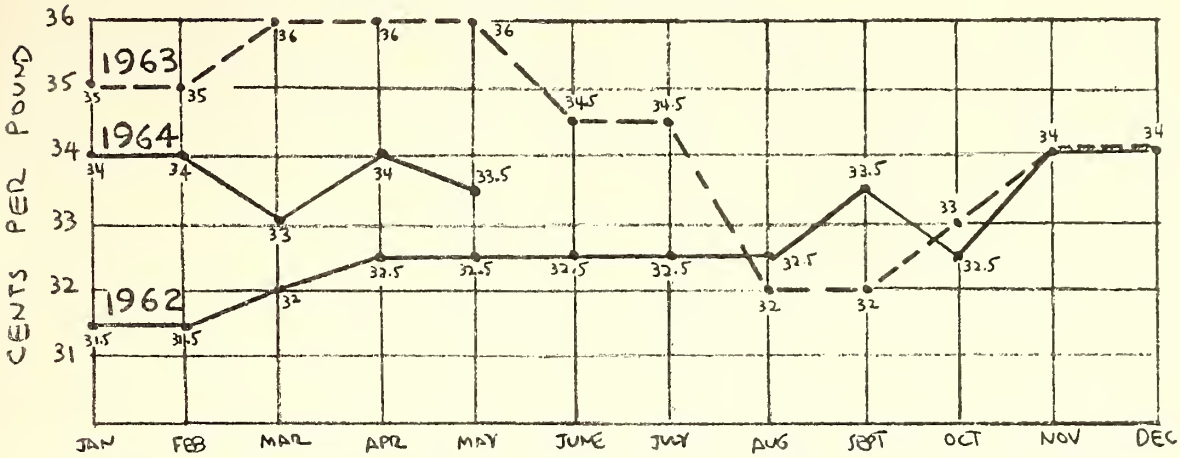
For these two frozen processed products, there are no strikingly obvious seasonal variations; further, the year-to-year patterns are markedly dissimilar.

Average prices for frozen ocean perch fillets at Chicago (Figure 24) rose slowly during 1962, from 31.5¢ per pound in January to 34¢ per pound in November and December. In 1963 the January average started at 35¢ per pound, rose to a high of 36¢ per pound during spring, slipped to an early autumn low of 32¢ per pound, then advanced to 34¢, as the year ended. In 1964-through-May, prices were steady around the 33¢-34¢ level.

The story was roughly similar for frozen flounder and sole fillet prices on the Chicago wholesale market (Figure 25). After a low-level 1962 start at 36.25¢ per pound, prices dipped slightly to 35.5¢ in June and July, climbed rapidly to 39¢ in October, and then dipped to 38¢ per pound in December. 1963 opened at 39¢ per pound, prices rose in spring to 40.5¢, then slackened to 39¢ and 39.5¢ per pound, rising to 40¢ at the year's end. Average Chicago prices started at 39¢ per pound in January 1964, dropped to 38¢ in May.

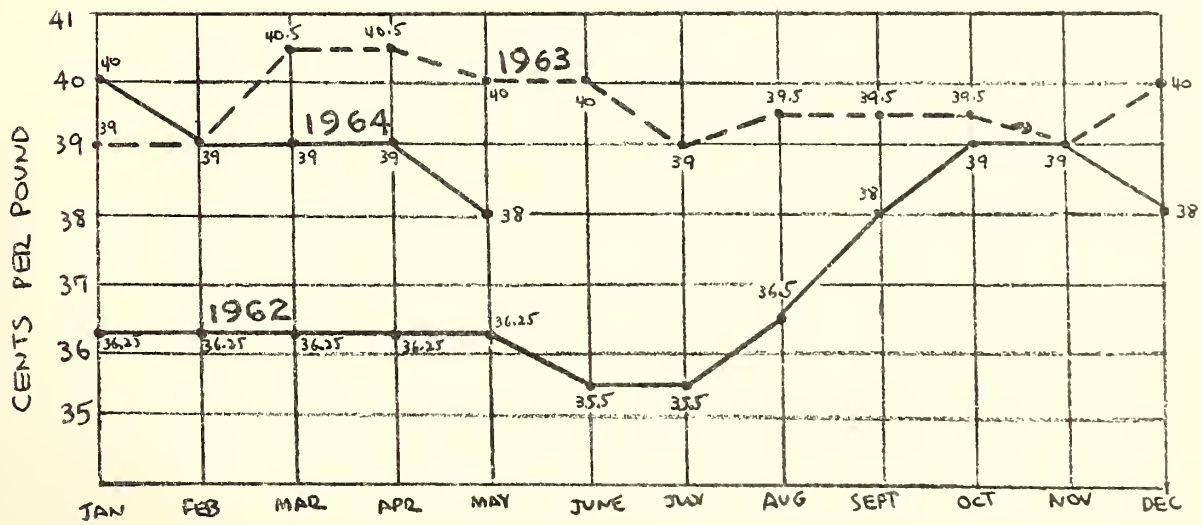
Neither of the Chicago market frozen fillet price charts (Figures 24 and 25) shows any discernible correlation with the landed price and landing charts (Figures 20-23). Cold-storage holdings of the frozen products helped smooth out the variations in landing patterns.

FIGURE 24 - MONTHLY AVERAGE WHOLESALE PRICES ON THE CHICAGO MARKET FOR FROZEN OCEAN PERCH FILLET #5'S (Domestic, Skin-on, Large), JANUARY 1962-MAY 1964. Prices as reported by original receivers.



Source: 1962 and 1963 MNS Annual Summaries, and 1964 MNS Monthly Summaries of Receipts and Prices of Fresh and Frozen Fishery Products at Chicago.

FIGURE 25 - MONTHLY AVERAGE WHOLESALE PRICES ON THE CHICAGO MARKET FOR FROZEN FLOUNDER AND SOLE FILLET #5'S (Canadian), JANUARY 1962-MAY 1964. Prices as reported by original receivers.



Source: same as Figure 24, above.

Although the above two figures show detailed monthly trends for the general ocean perch and flounder and sole classifications, the Chicago MNS does not have statistics breaking down the classifications into their Atlantic and Pacific components; there are no such statistics published.

July 1964 interviews with five important Chicago area primary receivers revealed that the then-current price of frozen Pacific Ocean perch was somewhat lower than the 1963 level but that prices were holding steady. They explained the present trend as the result of large supplies and light demand, even though sales are increasing (see Figure 16). The price of west coast sole was described as steady, with the primary receivers noting that supply was occasionally inadequate for demand.

5 E. MANAGEMENT AND FLEXIBILITY OF OPERATION

Throughout this report we have stressed the importance of professionalism on the part of an Alaska bottomfishery for survival in the competitive marketplace...professionalism which must be evident in all phases of the operation--planning, operations, producing and distributing. The perishability of fish products (even in their frozen state) necessitates speed and efficiency in processing, handling and marketing. Clearly, the successful management of a bottomfishery in Alaska--far from markets, comparatively isolated, requiring supplies which must be imported over long and time-consuming distances, using transportation services which are sometimes hampered by climatic conditions--requires a highly capable management team with extensive experience in large-scale production and distribution of perishable products.

Professionalism must also reach down to the technical level. Technical skill and flexibility will be indispensable during the initial years of operation, while the fishing pattern is developed through trial and error, when unforeseen production and marketing problems must be solved and when unexpected opportunities can be exploited. The bottomfishery, in short, cannot be an experiment directed by amateurs, no matter how great their ability in other fields.

As an alternative to the relatively speculative operation of a facility selling products to primary receivers, an Alaska bottomfishery might concentrate on the manufacture of blocks for a sizeable processor-marketer. Careful consideration, however, leads us to conclude that this alternative may prove to be impractical. The northeastern Pacific lacks in species and/or acceptance of the vast cod and haddock resources which are the backbone of the highly-developed foreign block industry (haddock is absent, and the quality of Pacific cod is a moot question). In addition, block processing requires additional equipment, while block prices per pound are significantly less than for other forms: e.g., high-quality cod blocks, f.o.b. New England, averaged 24¢-26¢ in 1963, pollock blocks averaged 16-1/2¢ - 19¢.

Little information is currently available relating to the operating costs of large, modern fishing vessels in Southeastern Alaska waters. However, recent analyses by the U. S. Bureau of Commercial Fisheries seem to indicate that such vessels, if proven to be eligible for the recently approved Federal subsidy program, could operate at a profit if their catch could be sold at approximately 65% of Seattle landed prices.

Therefore, it is possible that, if a shore installation could be operated only a little above its "break-even" point, the way would be open to investment in such an installation by vessel owners or, even more aptly, by a processor as a "captive" plant.

Researchers found wide interest among midwestern processors in assuring a reliable source of supply of high quality fish. If by arrangement with a processor a regular market channel could be developed, investment in the vessels and shore plant might then become feasible and profitable.

In view of this, there is much to be said for continued study of vessel operating costs, catch rates and distribution possibilities.

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